REPORT

PHASE II RCRA FACILITY INVESTIGATION REPORT

ASHLAND DISTRIBUTION COMPANY CLEARFIELD, UTAH

Prepared for
Ashland Inc.
5200 Blazer Parkway
Dublin, OH 43017

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URS Corporation

700 South Third Street
Suite 700
Minneapolis, Minnesota 55415
(612) 370-0700
37679619

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1.0 Introduction

Ashland Inc. (Ashland) is submitting this Phase II report for the Resource Conservation and Recovery Act (RCRA) facility investigation (Phase II RFI) at Ashland Distribution Company facility (Facility) located in Clearfield, Utah. The report has been prepared in accordance with the corrective action portion of Ashland's RCRA permit – Module IV (Section IV.E: parts IV.E.1 and IV.E.2) and the Phase II RCRA Facility Investigation Work Plan (hereafter referred to as Phase II RFI Work Plan - URS, 2005) approved by UDEQ in a May 3, 2005 correspondence. The Phase II RFI Work Plan was submitted as an addendum to the Phase I RCRA Facility Investigation Workplan (URS, 2000, and URS, 2002 - Phase I RFI Workplan). The Phase II RFI Work Plan utilized the same methodologies as reported in the Phase I RFI Workplan.

1.1. PURPOSE

A Phase I RFI report was submitted to UDEQ on January 24, 2003. Based on UDEQ's September 22, 2004 comment letter on the Phase I RFI and a letter dated February 14, 2005, further sampling was indicated for tetrachloroethylene (PCE) at Solid Waste Management Units SWMU) 2 (Product Storage Tank Farm), 3 (Product Loading/Unloading Area), 5 (Railcar Unloading Area), and 7 (Waste Collection Tank Area). No additional investigation was indicated for SWMUs 1 (Solvent Recovery Sump), 8 (Waste Storage Tank), or 9 (Neutralization Unit Area). UDEQ requested in correspondence dated May 3, 2005 that a risk assessment or clean closure plan be submitted for SWMU 4 (Container Filling Area/Drumming Room) relevant to benzo(a)pyrene [B(a)P] and dibenz(a,h)anthracene [D(a,h)A] in soil and for SWMU 10 (Hazardous Waste Storage Area) relevant to PCE in soil.

Accordingly, the purpose of the Phase II RFI was to conduct further sampling for PCE in soil at SWMUs 2, 3, and 5 and in groundwater at SWMU 7. No additional sampling and analysis was conducted for B(a)P and D(a,h)A or for PCE in soil at SWMU 10 during the Phase II RFI. This Phase II RFI report includes sufficient information to support the risk-based closure of SWMUs 2, 3, 4, 5, 7, and 10.

2.0 Description of Current Conditions

Information concerning the Facility history, land use, regional and local geology and hydrogeology, and nature and extent of constituents detected in environmental media is presented in the following documents previously filed with the UDEQ: a Description of Current Conditions at Ashland Chemical's Clearfield, Utah Facility (Woodward-Clyde, 1997), the RCRA Facility Assessment (RFA) Report (UDEQ, 1999), the Phase I RFI Workplan and Addendum (URS, 2000 and 2002), and the Phase I RFI Report (URS, 2003). Pertinent information from these reports and several published sources is summarized below.

2.1 GENERAL FACILITY INFORMATION

The Facility is located on 6.5 acres within an industrial park (Freeport Center) in the south half of Section 2, Township 4 North, Range 2 West (Salt Lake Base and Meridian) in the extreme northern part of Freeport Center. The Facility is located within the city of Clearfield, in Davis County, Utah (Figure 1). The geographical location of the Facility is 41° 6.294' North latitude and 112° 2.150' West longitude.

2.1.1 Facility History

The Facility and the Freeport Center Industrial Park were undeveloped until the early 1940s, when the Navy developed the property for use as a supply depot. The Navy operated the Freeport Center until about 1963. During the approximately 20 years of Naval ownership and use, there were a variety of operations employing potentially hazardous materials. According to a study prepared for the Freeport Center (Dames & Moore 1989), the Naval operations included 75 underground storage tanks for fuel oil and gasoline, gas stations, above-ground fuel tanks, transformer stations, and flammable materials storage. Currently, no information about actual products managed has been available, except for the above noted general type of products that were handled at the depot.

The Navy Supply Depot was purchased by the Freeport Center Associates in 1963 and developed into a manufacturing, distributing, and warehousing industrial park. The Freeport Center includes more than 7 million feet of warehousing space on more than 650 acres. Dozens of businesses have established facilities at the Freeport Center, although from 1963 to 1982 (when Ashland took occupancy) only one tenant (A&K Railroad) other than the Navy previously occupied the property now used by Ashland.

Historically, during the period that the Facility property was part of the Navy Supply Depot and/or A&K Railroad's operations, there is minimal documentation as to whether spills or releases occurred. Therefore, undocumented spills or releases of potentially hazardous substances may have occurred prior to Ashland's occupancy of the Facility. In fact, there is evidence that degradation of groundwater had taken place prior to startup of Ashland's operations at the Facility. A report by Dames & Moore (1982) documented elevated concentrations of phenols, total organic carbon, and halogenated compounds in a groundwater sample collected from a well on the extreme upgradient side of the Facility. However, it is unknown what caused this groundwater contamination.

According to the Dames & Moore study from 1982, a release of product occurred during removal of an underground storage tank (UST) that was located 200 feet east and upgradient of a monitoring well MW-2 at the northeast corner of the Facility. The UST was reportedly punctured during removal operations and a large volume of the contents spilled back into the excavation. The excavation was backfilled and graded over. The type of product spilled was not disclosed, nor were volume estimates provided of product lost to the subsurface.

According to Mr. Stephen Barrett, General Manager of the Freeport Center, the Facility known as Building 12 and currently occupied by Ashland was used by the Navy as a railroad engine roundhouse (Woodward-Clyde 1997). Railroad tracks still present on the south side of the Facility formerly extended into a large bay in Building 12, inside of which the Navy performed maintenance on the engines. There is no historical documentation available describing this work. It is unclear how waste from these operations was disposed.

A&K Railroad Salvage (A&K) occupied the Building 12 property from 1963 until 1982. As reported in the Analytical Results Report, A&K Railroad (UDEQ March 4, 1999), A&K occupied a significantly larger parcel of property that that currently occupied by Ashland. According to Mr. Barrett, A&K refurbished railroad materials at the site during these years. Specific information concerning the processes employed by A&K are not available, but there were fuel tanks on the property and railroad ties have been reported to have been stored in the western portions of the property. Also, as noted in the 1999 UDEQ report, buildings, parking lots, and roadways cover approximately 80 percent of the former A&K surface area and that Building 12 is the only surficial remnant of the A&K facility. This report also points out that reported observations of historic A&K operations indicate that solvents were allowed to contact the unlined ground surface over an extended period of time. The Davis County Health Department received complaints of livestock deaths in 1970 from contaminated water in an area approximately 3 miles south of the Freeport Center near a storm sewer outfall. Health Department Inspectors traced the contamination back to a "frothy-green" water in the storm drains within Freeport Center boundaries. The source of this contamination was thought to be from oily residues from A&K and/or chromate solutions from a metal plating facility (UDEQ/DERR, 1995). Soil and groundwater sampling and analysis was conducted to evaluate the A&K property, however, no samples were collected on the portion of the property currently occupied by the Facility. The 1997 Site Inspection at the A&K Railroad site detected levels of polyaromatic hydrocarbons (PAHs) in all of the samples (including: benzo(b)fluoranthene, B(a)P, and D(a,h)A above residential, and below occupational health based screening values available at the time). Groundwater samples were also obtained outside the premises of the Facility. Groundwater samples were collected from a depth of 30 feet below ground, far below the sampling interval for groundwater obtained during the Facility RFI. Surface water and sediment samples were obtained and showed detections of trichlorobenzene, 4-chlor-3-methylphenol, 2-4-dicholorbenzene, and/or PAHs. These results indicate that PAHs and other contaminants were existent in environmental media prior to Ashland's operations at the facility (as all samples were collected outside the portion of the A&K Railroad site that is occupied by the Facility).

2.1.2 Current Facility Operations

The Facility is currently a chemical distribution operation where bulk chemicals brought to the Facility are repackaged for distribution to industrial and commercial users in the Utah area. Bulk solvents are received at the Facility by tank truck and railcar for storage in the product tank farm (Figure 2). Identified SWMUs are shown on Figure 3. Solvents are drummed, blended, and resold in bulk or less-than-truckload quantity. No chemical manufacturing is done at this Facility.

Mixed solvent residual products are recovered from transfer hoses, pumps, and blend tanks when switching between products. The recovered solvents are placed in 55-gallon drums and segregated into product classes (nonhalogenated light products, nonhalogenated heavy products, and halogenated products). Recovered solvents are either sold for beneficial use or shipped off site to a solvent reclaimer or a waste disposal firm.

Hazardous waste is also stored on the Facility in accordance with the Facility's RCRA permit. The waste comes in the form of spent solvent returned from Ashland customers for temporary storage until it is shipped off site for disposal. Historically, spent solvent was stored in drums in the hazardous waste storage area (SWMU #10) or in a bulk storage tank in the waste storage area (SWMU #8). Hazardous waste management has been transferred to the recently permitted new hazardous waste storage area.

2.2 LAND USE INFORMATION

Demographics of this part of Utah's Front Range of the Wasatch Mountains are changing. There is significant population growth on the east shore of the Great Salt Lake, including in the Clearfield area. Industries are moving into the area and residential housing is also displacing agriculture on land once dedicated to crops. The Freeport Center was, before development in the early 1940s, a farming and ranching area. While the lands east of the Freeport Center have been developed for some time, rural zones west of the Freeport Center and Clearfield are increasingly being developed. The Facility itself is bordered on all sides by industries of the Freeport Center. The closest residence is estimated to be ¾ mile from the Facility.

2.2.1 Topography

Figure 1 illustrates the topography at the Facility and the surrounding area. The Facility and surrounding industrial park lie on relatively flat terrain. Elevations on site range from about 4,408 feet above mean sea level (msl) to approximately 4,400 feet msl. The topographic trend for the Facility reflects a regional pattern. The Facility rests in the Great Salt Lake Valley basin, on alluvial and colluvial sediments eroded from the Wasatch Mountains to the east. Elevations are therefore higher toward the mountains to the east, gradually decreasing toward the Salt Lake Valley to the west. The Facility slope is similar with highest elevations on the east side and lowest elevations on the west.

2.2.2 Regional Geology and Hydrogeology

Unconsolidated, fine grained, lacustrine sand, silt, and clay material, which originally eroded from the Wasatch Mountains, comprise the soil beneath the Freeport Center area. However, it is

believed that the surficial material at the Facility consists primarily of fill material, which was imported to the Freeport Center area at an undetermined time. Two borings drilled at the Facility (Dames and Moore 1982) show that approximately two to four feet of fill material is present (Figure 4). These borings were later completed as wells MW-1 and MW-2 (Figure 5). Based on the boring logs, the fill material typically consists of light brown, fine sandy silt, silty fine and coarse gravel with some fine and coarse sand. Underlying the fill are silts with some clay and fine sand, or clayey silt to about 5 to 6.5 feet below grade. MW-2, in the northeast portion of the Facility, encountered silty clays from about 5 feet to approximately 20 feet below grade, with some thin layers of intervening fine sand. Below this layer were fine sands with small amounts of silt that extended to boring completion at about 28.5 feet below grade. MW-1, on the southwest portion of the Facility, encountered silty, very fine sands grading with thin layers of silt and clay to about 14 feet below grade. From 14 feet to about 19 feet below grade, silty clays were encountered with interbedding layers of fine sand. From about 19 feet to 31 feet below grade, silty fine sands with thin silty clay seams were logged.

Two principal hydrogeologic units are present below the Facility. A shallow unconfined aquifer is reported to range from approximately 10 feet to about 25 feet below grade in this area (USGS 1972). A deeper, confined aquifer exists below the unconfined aquifer, and can be very prolific, having typical yields of 500 to 1,000 gallons per minute (gpm), sometimes achieving yields as high as 4,000 gpm. The deeper aquifer exists under artesian conditions, with potentiometric pressures sufficient to produce flowing wells. The deeper aquifer is found at depths greater than 400 feet below grade.

The unconfined shallow aquifer is predominantly comprised of silty fine sands and fine sandy silts, with significant heterogeneity of interbedded layers of clay, silt, and sand (Dames and Moore 1989), and is consistent with materials encountered in the two site borings. Water levels measured in wells MW-1 and MW-2 have ranged from about 5 feet below grade to about 12 feet below grade. The unconfined groundwater flow is reported to have a gradient of about 0.01 feet/feet (Dames and Moore 1989, USGS 1972). Shallow groundwater flow direction for the unconfined aquifer below the Facility is inferred east-northeast to west-southwest, following the topography.

2.3 RECEPTOR INFORMATION

There are no significant surface water drainages in the vicinity of the Facility. The largest stream in the area is the Weber River, located approximately four miles to the north and east of the Freeport Center. Surface water that falls as precipitation at the Facility infiltrates to the subsurface, or is captured in stormwater collection systems for discharge. The discharge is permitted and monitored by UDEQ (Permit UTR 000222). There are no designated wetlands near the Facility (USFWS, 1997). The primary wetland and waterfowl habitat in the area is adjacent to the east shore of the Great Salt Lake. Some intermittently saturated marshlands are approximately three miles west of the Facility. The Howard Slough State Waterfowl Management Area is more than four miles west of the Facility.

A number of threatened, endangered, and sensitive (TES) species are known to occur or nest along the Front Range of the Wasatch Mountains, including the bald eagle (*Haliaeetus*

leucocephalus), but there are no known special status or sensitive species within one mile of the Facility (Woodward-Clyde, 1997). One Utah sensitive species is known to occur in this area. The western snowy plover (*Charadrius alexandrinus*) nests on the beach shorelines of the Great Salt Lake. The nearest known nesting site for a western snowy plover is about eight miles west of the Facility.

The Ashland Facility is part of a large manufacturing and industrial storage complex (Freeport Center) and is expected to remain as an industrial use area in the future. Access to the Facility is restricted by a chain-link fence. Therefore, potential human receptor populations now and in the future include Ashland on-site workers, contract construction workers, or authorized visitors. Access to the Facility is restricted; therefore, exposure is limited to personnel working at the Facility and individuals permitted to enter the area. Most of the Facility has been covered with concrete mitigating the potential for exposure to environmental media. There are no residential areas in the immediate vicinity. The closest residence is estimated to be ¾ mile from the Facility.

Human exposure to groundwater emanating from the Facility is unlikely since there are no shallow, domestic-use groundwater wells in the vicinity. A water rights search of the vicinity showed only seven groundwater wells within one mile downgradient (west to southwest) from the Facility. The seven downgradient wells have the key features and uses shown on Table 1. Figure 6 shows the location of these wells with respect to the Facility. Only wells numbered 2 and 3 withdraw water from the shallow unconfined aquifer for irrigation purposes. The remainder of the wells (with the exception of well number 2 and 3) are screened at depths greater than 400 feet deep in the deep confined aquifer.

3.0 Variances to Work Plan

The site investigation was performed in general accordance with the Work Plan (URS, 2005). The site investigation was discussed with UDEQ staff (Ms. Connie Rauen) who was present during the Phase II RFI implementation and collected three split soil samples (BHA-2, BHC, and BG002).

3.1 FIELDWORK SCHEDULE

Environmental drilling began on June 24, 2005, after submittal of the Work Plan on April 20, 2005 and approval of the Work Plan by UDEQ on May 3, 2005.

4.0 Subsurface Facility Investigation

4.1 SCOPE OF INVESTIGATION

The scope of field work for this Phase II RFI included the following:

- The completion of five soil borings, collection of soil samples, and chemical analysis of soil samples for PCE at SWMUs 2, 3, 5, and 7; and
- The collection and chemical analysis of groundwater samples for PCE from a soil boring at SWMU 7.

A detailed discussion of field methods can be found in the UDEQ approved Phase I RFI Workplan. A detailed discussion of the sampling network design, the rationale for drilling soil borings, and collecting soil and groundwater samples can be found in the UDEQ approved Phase II RFI Work Plan.

4.1.1 Project Target Parameters

Per the Phase II RFI Work Plan, the soil and water samples were analyzed for PCE. The analytical methods and method detection limits for the specified parameters are presented in Tables 2 and 3.

4.1.2 Data Quality Objectives

Data Quality Objectives (DQOs) are qualitative and quantitative statements that specify the quality of the data required to support decisions made during investigative activities. Since DQOs are based on the end uses of the data collected, different data uses may require different levels of data quality. Data quality indicators were calculated during the independent data validation and data validation codes were assigned to laboratory results as appropriate. Data precision, accuracy, completeness, representativeness, and comparability were assessed according to provisions of the SAP and appropriate SOPs.

4.2 PHYSICAL GEOLOGY

The discussion of the physical geology at the site is based on previous work (Dames & Moore, 1982) and the 16 soil borings completed during the Phase I RFI (Figure 7); no changes to the physical geology description are necessary based on the Phase II RFI. Boring logs for the Phase II RFI soil borings are included in Appendix A. Analytical soil and groundwater laboratory data are included in Appendix B and physical soil data is summarized in Table 4. A Quality Assurance Review was completed as specified in the Work Plan.

A variety of unconsolidated soil types underlie the Facility. Two geologic cross sections have been prepared to depict the Facility geology. The locations of the cross sections are shown on Figure 8. Some degree of filling has occurred across the industrial park and the Facility property. The fill material was imported to the Freeport Center at an undetermined time and ranges from 2.0 to 3.5 feet of gravelly sand and sandy gravel mixtures or concrete. Underlying the fill material are several native soil types, including clay, silt, sand, and gravel. The clay (silty

clay) soil appears to be continuous across the entire Facility (Figures 9 and 10). The silt (clayey silt) soil type appears to extend across the majority of the site; where it is absent, it is replaced by the silty clay soil. The top of the clayey silt is typically found between two and five feet below grade and is typically between two and five feet thick. The top of the silty clay is found between two and ten feet below grade and is typically between five and 17 feet thick. Only monitoring wells MW-1 and MW-2 penetrated the silty clay. Monitoring MW-1 encountered a fine-grained silty sand and MW-2 encountered a fine-grained sand with a trace of silt.

4.3 PHYSICAL HYDROGEOLOGY

The water table across much of the site is relatively flat, and occurs within silt or silty sand deposits beneath the fill. The depth to groundwater is typically between three and six feet below grade. The elevation of the water table is typically between 4,403 and 4,404 feet above msl.

The soil borings were not installed for a sufficient period of time to allow the water level in the soil borings to reach equilibrium; therefore a site-specific groundwater flow direction and gradient have not been calculated. Groundwater is inferred to flow to the southwest to west-southwest, toward the Great Salt Lake. The unconfined shallow aquifer present beneath the Facility is reported to have a gradient of 0.01 feet/feet (Dames and Moore 1989, USGS 1972).

4.4 SUMMARY OF ANALYTICAL RESULTS: RFI PHASES I AND II

UDEQ indicated that constituents of concern (COCs) requiring further evaluation in the Phase II RFI were as follows:

- PCE in soil at SWMUs 2, 3, 5, and 10
- PCE in groundwater at SWMU 7
- D(a,h)A and B(a)P at SWMU 4

The soil and groundwater results for these constituents from the Phase I RFI and the Phase II RFI are described in this section. Figures 11 and 12 spatially depict the soil concentrations of detected compounds and Figure 13 spatially depicts the groundwater concentrations of detected compounds.

In the Phase I RFI, soil results were evaluated relative to USEPA's generic soil screening levels (SSLs) in a manner consistent with Utah Regulation R315-101-5, Health Evaluation Criteria, Risk Assessment. Actual land use conditions and exposure scenarios were identified for the facility, as described in R315-101-5.2 (b)(2). Subsurface soil pathways identified as potentially complete in the conceptual site model (CSM) for construction workers included incidental ingestion, inhalation of dust and volatiles, and dermal contact. The CSM was comparable to the USEPA's SSL scenarios for commercial and industrial settings for outdoor workers and the assumptions used for the calculation of the generic SSLs. Soils analytical results were compared to generic USEPA SSLs in a manner consistent with Utah Regulation R315-101-5 (for pathways including: ingestion-dermal, inhalation of volatiles, inhalation of fugitive particulates and, as a conservative measure, migration to groundwater using a dilution attenuation factor [DAF] of 20).

Similarly, groundwater analytical results from the Phase I RFI were compared to USEPA maximum concentration limits (MCLs) and Utah Groundwater Standards listed under R317-6-2. Since the MCLs are equal to or less than the Utah standards, or the Utah standards have not been formulated for all compounds with an MCL, only the MCLs are listed in this report.

4.4.1 Soil

The soil boring locations for the Phase I and II RFI investigations are shown on Figure 7. A MiniRAE Plus photoionization detector (PID) with a 10.6 eV lamp was used to field screen selected headspace samples. The laboratory analytical samples were collected from intervals selected in the Phase II RFI Work Plan. The recorded headspace values are presented in Table 5 and included on the individual boring logs (Appendix A).

During the Phase II RFI field work, a total of nine soil samples (including one duplicate sample) were collected from five sample locations. Analytical results for the Phase II investigation are provided in Appendix B; a summary of results is provided in Tables 6 and 7. Phase I and II RFI analytical results are grouped with their respective SWMU and summarized below relative to the COCs (i.e., PCE for SWMUs 2, 3, 5, 7, and 10 and D(a,h)A and B(a)P for SWMU 4).

SWMU #2 Product Storage Tank Farm

Phase I Investigation

During the 2002 RFI sampling soil boring AC-BH002 was completed at the southeast corner of the product storage tank farm and waste storage tank areas, near a secondary containment sump drain line, to a depth of six feet below grade. Samples were collected from 4.0 to 5.0 feet below grade. PCE was detected at a concentration of 100 ug/kg with a "J" flag for concentrations below the quantification limit. The 100 ug/kg "J" concentration exceeded the Migration to Groundwater generic SSL of 60 ug/kg for PCE.

Soil boring AC-BH003 was completed at the southwest corner of the product storage tank farm, near a secondary containment drain line, to a depth of seven feet below grade. Samples were collected for VOC, SVOC, metals, and cyanide laboratory analysis from 2.0 to 4.0 feet below grade and 6.0 feet below grade. PCE was not detected in the sample.

Soil boring AC-BH002 was completed at the southeast corner of SWMU 2. PCE was detected in the soil sample from four to five feet below grade at a concentration of 100 ug/kg with a "J" flag, which indicates that the result was an estimated value below the reporting limit. Using information from surrounding Phase I RFI sampling locations, PCE was detected inAC-BH007 (15 feet south of AC-BH002) at a similar depth at a concentration of 4.1 ug/kg with a "J" flag. PCE was also detected in AC-BH016 (40 feet northeast of AC-BH002) at a concentration of 1.9 ug/kg with a "J" flag. PCE was not detected in AC-BH001 (20 feet south-southwest of AC-BH002) with a detection limit of 5.6 ug/kg. PCE was not detected in AC-BH003 (over 80 feet west ofAC-BH002) with a detection limit of 5.4 ug/kg.

The horizontal extent of the PCE at SWMU 2 was defined in the Phase I RFI. The Phase II WP recommended that the AC-BH002 location be resampled and analyzed for PCE to verify the

reported concentration of 100 ug/kg with a "J" flag. A sample was also planned from the seven to eight feet interval.

Phase II Investigation

During the 2005 Phase II RFI sampling, soil boring AC-BH002 was resampled at the 4.0 to 5.0 feet below grade to confirm the "J" flag result from 2002 and sampled in the 7.0 to 8.0 feet below grade to evaluate the vertical extent of impacts. PCE was below method detection limits in both samples.

SWMU #3 Product Loading/Unloading Area

Phase I Investigation

Soil boring AC-BH004 was completed near the center of the product loading/unloading area by the northernmost floor drain beneath the truck rack canopy, to a depth of 12 feet below grade. Samples were collected from 2.5 to 4.5 feet below grade. PCE was below the generic SSLs.

Soil boring AC-BH005 was completed near the easternmost floor drain beneath the truck rack canopy to a depth of 12 feet below grade. Samples were collected for laboratory analysis from 5.0 to 6.0 feet below grade. PCE was detected at a concentration of 300 ug/kg, which exceeded the migration to groundwater generic SSL of 60, (but was below the ingestion-dermal and inhalation SSLs).

Soil boring AC-BH006 was completed near the southernmost floor drain beneath the truck rack canopy, to a depth of 12 feet below grade. Samples were collected for laboratory analysis from 2.5 to 3.5 feet below grade. PCE was below the generic SSLs.

Soil boring AC-BH005 was completed in the north central part of SWMU 3. PCE was detected in the soil sample from five to six feet below grade at a concentration of 300 ug/kg. Consideration of information from surrounding Phase I RFI sampling locations was used to determine a sampling approach for the Phase II RFI. PCE was detected in AC-BH010 (34 feet east-northeast of AC-BH005) at a similar depth at a concentration of 53 ug/kg with a "J" flag. PCE was not detected in AC-BH006 (10 feet west of AC-BH005) at a depth of 2.5 to 3.5 feet below grade at a detection limit of 5.6 ug/kg. PCE was not detected in AC-BH004 (12 feet northwest of AC-BH005) at a depth of 2.5 to 4.5 feet below grade at a detection limit of 6.1 ug/kg. PCE was not detected in AC-BH012 (28 feet southeast of AC-BH005) at a depth of 6.0 to 7.5 feet below grade at a detection limit of 6.1 ug/kg. PCE was not detected in AC-BH001 (24 feet northeast of AC-BH002) with a detection limit of 5.6 ug/kg.

Borings were proposed to the north (BH-A) and south (BH-B) of AC-BH005 (within approximately 20 feet radius ofAC-BH005 and at the edge of concrete) from one to two feet below grade and five to six feet below grade to evaluate the horizontal/vertical migration potential.

Phase II Investigation

During the 2005 Phase II RFI, soil boring BH-A was completed approximately 20 feet north of AC-BH005. Samples were collected for PCE laboratory analysis from the 1.0 to 2.0 feet below grade and 5.0 to 6.0 feet below grade. PCE was detected in the 1.0 to 2.0 feet below grade sample at a concentration of 0.28 ug/kg with a "J" flag. PCE was not detected in the 5.0 to 6.0 feet below grade sample, or in a blind duplicate, both with detection limits of 0.20 ug/kg.

During the 2005 Phase II RFI, soil boring BH-B was completed approximately 20 feet south of AC-B005. Samples were collected for PCE laboratory analysis from the 1.0 to 2.0 feet below grade and 5.0 to 6.0 feet below grade. PCE was detected in the 1.0 to 2.0 feet below grade sample at a concentration of 0.20 ug/kg with a "J" flag. PCE was not detected in the 5.0 to 6.0 feet below grade sample, or in a blind duplicate, both with detection limits of 0.21 ug/kg.

SWMU #4 Container Filling Area (Drumming Room)

Phase I Investigation

Soil boring AC-BH007 was completed to the southwest of the westernmost floor drain of the drumming room, to a depth of six feet below grade. Samples were collected for laboratory analysis from 3.5 to 4.5 feet below grade. A duplicate sample was also submitted. D(a,h)A and B(a)P were not detected in the samples.

Soil boring AC-BH008 was completed adjacent to the center floor drain of the drumming room, to a depth of six feet below grade. Samples were collected for analysis from 3.5 to 4.5 feet below grade. B(a)P, detected at a concentration of 930 ug/kg, exceeded the ingestion-dermal SSL of 200 ug/kg (but was below the migration to groundwater SSL). D(a,h)A was detected at a concentration of 370 ug/kg, which exceeded the ingestion-dermal SSL of 200 (but was below the migration to groundwater SSL).

Soil boring AC-BH009 was completed adjacent to the easternmost floor drain of the drumming room, to a depth of eight feet below grade. Samples were collected for laboratory analysis from 3.0 to 4.0 feet below grade. D(a,h)A and B(a)P were not detected.

Soil boring AC-BH010 was completed to the south of the drumming room, to a depth of 12 feet below grade. Samples were collected for laboratory analysis from 4.0 to 6.0 feet below grade. No individual VOCs exceeded the generic SSLs. D(a,h)A and B(a)P were not detected.

In summary, AC-BH008 was completed in the center of SWMU 4 within a sump that contained a concrete-closed former drain line. B(a)P and D(a,h)A were detected at concentrations of 930 and 370 ug/kg, respectively. Consideration of other borings sampled during the Phase I investigations showed that B(a)P and D(a,h)A were not detected in any of the five other borings (BH001, AC-BH002, AC-BH007, AC-BH009, and AC-BH010) that surround AC-BH008 and were located within 20 feet of AC-BH008. Detection limits in AC-BH001, AC-BH002, AC-BH007, and AC-BH009 were 330 ug/kg for both compounds. Detection limits inAC-BH010 were 400 ug/kg for both compounds.

Phase II Risk Assessment Approach

UDEQ requested further investigation of B(a)P and D(a,h)A at SWMU 4 based on the results of the Phase I RFI. However, the horizontal extent of the B(a)P and D(a,h)A impacts have been defined as described above by existing soil borings. From a site-specific perspective, the concrete floor of SWMU 4 effectively mitigates potential exposure to the compounds and further intrusive investigation would reduce the integrity of the concrete floor/cap. Finally, PAHs are not, nor have ever been, a constituent handled at the facility. UDEQ requested a risk assessment in compliance with permit Condition IV.J or a plan for clean closure by removal of the contamination, in compliance with permit Condition IV.I for B(a)P and D(a,h)A at SWMU 4 . A risk assessment is included in this report as Section 5.

SWMU #5 Railcar Unloading Area

Phase I Investigation

Soil boring AC-BH011 was completed adjacent to a former sump associated with the railcar unloading area, to a depth of 12 feet below grade. Soil samples were collected from 6.0 to 7.0 feet below grade. PCE was below the generic SSLs.

Soil boring AC-BH012 was completed adjacent to a former sump associated with the railcar unloading area, to a depth of 12 feet below grade. Soil samples were collected for VOC laboratory analysis from 6.0 to 7.5 feet and 9.0 feet below grade. PCE was below the generic SSLs.

Soil boring AC-BH013 was completed adjacent to a former sump associated with the railcar unloading area, to a depth of 12 feet below grade. Soil samples were collected for laboratory analysis from 3.5 to 4.0 feet and 12 feet below grade. PCE was detected at a concentration of 290 ug/kg in the 12 feet below grade sample, which exceeded the migration to groundwater generic SSL of 60 ug/kg (but was below the ingestion-dermal and inhalation SSLs).

Soil boringAC-BH013 was completed in the eastern portion of SWMU 5. PCE was detected in the soil samples from 3.5 to 4.0 feet below grade (5.8 ug/kg) and from 12 feet below grade (290 ug/kg with a "J" flag). Consideration of other borings sampled during the Phase I investigations showed that PCE was detected inAC-BH010 (80 feet west ofAC-BH013) at four to six feet below grade at a concentration of 53 ug/kg with a "J" flag. PCE was also detected inAC-BH009 (75 feet northwest ofAC-BH013) at three to four feet below grade at a concentration of 1.9 ug/kg with a "J" flag. PCE was not detected in AC-BH012 (85 feet west of AC-BH013) at depths of 6.0 to 7.5 feet and 9.0 feet with a detection limit of 6.1 ug/kg. The Phase II RFI Workplan included borings at approximately 20 feet west (BH-C) and south (BH-D) of AC-BH013 at the 11 to 12 feet below grade.

Phase II Investigation

During the 2005 Phase II RFI, soil boring BH-C was completed approximately 20 feet west of AC-BH013. Samples were collected for PCE laboratory analysis from the 11.0 to 12.0 feet below grade. PCE was not detected in the 11.0 to 12.0 feet below grade sample with a detection limit of 33 ug/kg.

During the 2005 Phase II RFI, soil boring BH-D was completed approximately 20 feet south of AC-BH013. Samples were collected for PCE laboratory analysis from the 11.0 to 12.0 feet below grade. PCE was not detected in the 11.0 to 12.0 feet below grade sample with a detection limit of 33 ug/kg.

SWMU #10 Hazardous Waste Storage Area

Phase I Investigation

Soil boring AC-BH016 was completed adjacent to the central floor drain of the hazardous waste storage area, to a depth of 12.0 feet below grade. Soil samples were collected for laboratory analysis from 3.5 and 8.0 feet below grade. PCE was detected at a concentration of 200 ug/kg in the 3.5 feet below grade sample, which exceeded the migration to groundwater generic SSL of 60 ug/L (but was below the generic ingestion-dermal and inhalation SSLs).

Soil Boring AC-BH016 was completed in the center of SWMU 10 immediately adjacent to a former drain line that had been concreted closed. PCE was detected at a concentration of 200 ug/kg with a "J" flag at a depth of 3.5 feet below grade and below detectable levels (less than 8 ug/kg) at eight feet below grade. Consideration of other Phase I RFI sampling locations showed that PCE was detected in AC-BH009 (38 feet south-southwest of AC-BH016) at three to four feet below grade at a concentration of 1.9 ug/kg with a "J" flag. PCE was also detected in AC-BH002 (43 feet southwest of AC-BH016) at four to five feet below grade at a concentration of 100 ug/kg with a "J" flag. Vertical definition of PCE in SWMU 10 was achieved in the Phase I RFI.

Phase II Risk Assessment Approach

UDEQ requested further investigation of PCE impacts as part of the Phase II RFI. However, vertical definition of the extent of PCE was achieved in the Phase I RFI. No further investigation was proposed in the Phase II RFI. From a site-specific perspective, use of the area for hazardous waste storage has been discontinued, the concrete surface of SWMU 10 effectively mitigates the potential for exposure to PCE in soil and migration of PCE in soil to groundwater, and further intrusive investigation will reduce the integrity of the concrete warehouse floor/cap. UDEQ requested a risk assessment in compliance with permit Condition IV.J or a plan for clean closure by removal of the contamination, in compliance with permit Condition IV.I for PCE in soil at SWMU 10. A risk assessment is included in this report as Section 5.

4.4.2 Groundwater

The Phase II groundwater investigation was limited to further evaluation of PCE detected at SWMU 7. Groundwater sampling results from RFI Phase I and II for SWMU 7 are discussed below. Analytical results are included in Appendix B. A summary of the chemical results for groundwater and a comparison to the MCLs are presented in Table 8.

SWMU #7 Waste Collection Tank Area

Phase I Investigation

Soil boring AC-BH014 was completed within the former waste collection tank (SWMU #7) basin. A grab groundwater sample was collected from the boring. PCE was detected in the water sample at a concentration of 6.1 micrograms per liter (ug/L), slightly above the 5.0 ug/L USEPA MCL. Considering samples collected at other borings during the Phase I RFI shows that PCE was also detected in the water sample from AC-BH007 (60 feet east of AC-BH014) at a concentration of 0.97 ug/L with a "J" flag. PCE was not detected in the water sample from AC-BH001 (50 feet east of AC-BH014) with a detection limit of 1.0 ug/L. PCE was not detected in the water sample from AC-BH003 (30 feet northwest of AC-BH014) with a detection limit of 1.0 ug/L. Grab samples provide conservative information compared to a traditionally purged groundwater sample. It would be expected that such data would provide results that would be higher than what would be expected from a well. Perched ground water was only sporadically encountered across the site as detailed in the Phase I RFI Report. The Phase II RFI Workplan included groundwater sampling at a location between SWMU 7 and monitoring well MW-1 (BH-E) to verify the detection at AC-BH014.

Phase II Investigation

During the 2005 Phase II RFI, soil boring BH-E was completed approximately 40 feet west of AC-BH014. A water sample was collected from approximately 12 to 16 feet below grade and analyzed for PCE. PCE was not detected in the water sample from 12 to 16 feet below grade sample, including a blind duplicate, both with detection limits of 0.20 ug/L.

4.4.3 Investigative Derived Waste

Consistent with historical practice, investigative derived waste (IDW) was thinspread on site.

5.0 RISK ASSESSMENT

As outlined in Section IV.J of the Hazardous Waste Permit for the Facility (UDEQ, 1997), a human health risk assessment (HHRA) using standard and actual exposure scenarios may be used to support the risk-based closure option provided in Section IV.E.9 of the Permit. This section presents the results of an HHRA for the Facility based on the actual exposure scenario (i.e., industrial land use conditions). Detailed information describing the methodology used to evaluate risk at the Facility is provided in Appendix D.

There is no pathway by which terrestrial or aquatic biota could come into contact with SWMU-related chemicals because the Facility is located in a commercial/industrial area, the SWMUs are generally in areas that are covered with pavement or structures, and. In addition, in Section 2.5 of the Phase I RFI Report (URS Diamond, 2003), there are no wetlands near the Facility and the nearest known nesting site for a Utah sensitive species (western snowy plover) is about eight miles west of the Facility. Therefore, an ecological assessment is not warranted for the Facility and a waiver of the requirement for an ecological assessment of the Facility is therefore requested by Ashland. Section 2.5 of the Phase I RFI Report provides additional detailed information concerning the lack of available ecological habitat as well as the lack of threatened, endangered and sensitive species at the Facility (URS Diamond, 2003).

5.1 CONCEPTUAL SITE MODEL

A conceptual site model (CSM), for the Facility is presented below in Figure 14. The CSM outlines:

- Potential contaminant sources
- Potential release mechanisms
- Potentially affected media
- Potential migration pathways
- Potential human receptors

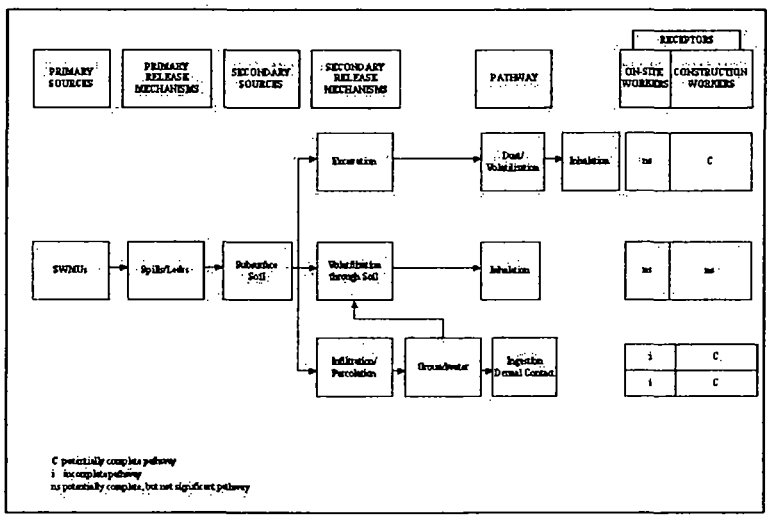

Figure 14: Conceptual Site Model for the Ashland Clearfield Facility

5.2 AREAS OF INTEREST

The areas of interest for the Facility are based on the results of the Phase I and Phase II RFI investigations and along with communication between UDEQ and Ashland (UDEQ, 2004; UDEQ, 2005a; UDEQ, 2005b). The results of the soil and groundwater investigation are summarized below. Only those SWMUs and COCs identified by UDEQ as requiring further evaluation subsequent to the Phase I RFI were evaluated further in this risk assessment. UDEQ indicated that COCs requiring further evaluation in the Phase II RFI were as follows:

- PCE in soil at SWMUs 2, 3, 5, and 10
- PCE in groundwater at SWMU 7
- D(a,h)A and B(a)P at SWMU 4

Detailed information regarding the soil and groundwater investigations are provided in the Phase I RFI Report (URS-Diamond, 2003) and this Phase II RFI Report.

5.2.1 Soil Investigation Results

The text below summarizes the Phase I and Phase II sampling results for PCE, B(a)P, and D(a,h)A at each SWMU investigated. Sampling locations for the borings discussed are shown on Figure 11. The detailed sampling results for each of these SWMUs are provided in Section 4.5.

5.2.1.3 Sampling Results for PCE in Soil

PCE was detected below SSLs for direct contact exposure (i.e., ingestion/dermal and inhalation of volatiles) in all soil samples, but above the generic migration-to-groundwater SSL with a dilution attenuation factor of 20 (DAF*20) in the following four sample locations during the Phase I RFI:

- SWMU 2 (Product Storage Tank Farm) – Boring AC-BH002,
- SWMU 3 (Product Loading/Unloading Area) – Boring AC-BH005,
- SWMU 5 (Railcar Top Unloading Stations) – AC-BH013, and
- SWMU 10 (Hazardous Waste Storage Area) – AC-BH016.

However, during the Phase II RFI, sampling conducted in PCE levels were not found above detection levels and/or at levels very near the limit of detection. Each of the samples were well below the SSLs.

5.2.1.2 Sampling Results for B(a)P and D(a,h)A in Soil

B(a)P and D(a,h)A were detected in soil samples above the SSLs for direct contact exposure (i.e., incidental ingestion and dermal pathways) at SWMU 4. A single sample, AC-BH008 (at 3.5 to 4.5 feet below grade) showed B(a)P and D(a,h)A at 930 and 370 ug/kg, respectively. These compounds were not detected in any of the five Phase I RFI borings (BH001, AC-BH002, AC-BH007, AC-BH009, and AC-BH010) that surround AC-BH008 and are located within 20 feet of AC-BH008. Additional sampling was not conducted for SWMU 4 during the Phase II RFI.

5.2.2 Groundwater Results

One compound, PCE was detected above the MCL in one sample during the Phase I RFI. PCE was detected above the MCL of 5.0 ug/L in one groundwater sample at a concentration of 6.1 ug/L at SWMU 7 boring AC-BH014 (Figure 13). PCE was not detected in samples collected during the Phase II RFI.

5.3 AREAS EVALUATED FOR THE HHRA

Further analysis of the Phase I and II RFI results has been conducted to provide a risk assessment to support closure of the Facility areas identified by UDEQ as requiring further evaluation subsequent to the Phase I RFI. These SWMUs include:

- SWMU 2 – PCE in soil
- SWMU 3 – PCE in soil
- SWMU 4 – B(a)P and D(a,h)A in soil
- SWMU 5 – PCE in soil
- SWMU 7 – PCE in groundwater
- SWMU 10 – PCE in soil

The only constituents identified as potential chemicals of concern (PCOCs) for the SWMUs and evaluated in this HHRA are PCE, B(a)P and D(a,h)A. Site-specific land use shows a hypothetical construction worker scenario as the primary direct contact exposure scenario for the property relative to the subsurface (i.e., below paved Facility areas) constituent detections.

5.4 HHRA RESULTS

5.4.1 B(a)P and D(a,h)A in Soil (SWMU #4)

As provided in the CSM presented in Section 5.1, B(a)P and D(a,h)A at SWMU #4 were evaluated assuming a construction worker exposure to excavated soil in the area defined by sample locations AC-BH001, AC-BH002, AC-BH007, AC-BH008, AC-BH009, and AC-BH010. Detected concentrations and a proxy concentration of one-half the sample quantitation limit (SQL) for non-detects were used to calculate a 95% upper confidence limit of the arithmetic mean (UCL) in soil of all depths using USEPA's ProUCL software (USEPA, 2003). This UCL was compared to the maximum detected concentration at all soil depths and the lesser of the two concentrations was selected as the exposure point concentration (EPC) to be used for evaluating risk. Detailed information regarding the calculation of the EPC and risk calculations is provided in Appendix D.

Table 9 shows that the estimated carcinogenic risk for a construction worker receptor potentially exposed to B(a)P and D(a,h)A at all soil depths is 5E-08, which is below UDEQ's criterion risk level of 1E-06 for a risk-based closure. This finding demonstrates that concentrations detected would not be expected to present an unacceptable risk to human health, indicating that SWMU #4 can be petitioned for NFA status.

5.4.2 PCE in Soil

PCE in soil was evaluated for SWMU #s 2, 3, 5, and 10. Figure 3 shows that these SWMUs are located adjacent to one another and were evaluated as a single unit. This unit includes the following sample locations.

- SWMU #2: AC-BH001, AC-BH002, AC-BH003, AC-BH007, AC-BH016
- SWMU #3: AC-BH004, AC-BH005, AC-BH006, BH-A, BH-B
- SWMU #5: AC-BH010, AC-BH012, AC-BH013, BH-C, BH-D
- SWMU #10: AC-BH002, AC-BH009, AC-BH016

Carcinogenic risk and noncarcinogenic hazard was also calculated using the maximum detected PCE concentration for the Facility. This second calculation was completed to demonstrate the upper-bound values for SWMU-specific risks. Detailed information regarding the calculation of the EPC and risk calculations is provided in Appendix D.

Table 10 shows the risks associated with the construction worker receptor exposed to PCE at all soil depths are 2E-08 (based on the Facility-wide EPC) and 3E-08 (based on the maximum detected PCE concentration at all SWMUs), which are below UDEQ's criterion risk level of 1E-06. This finding demonstrates that concentrations detected would not be expected to present an unacceptable risk to human health.

5.4.3 PCE in Water

Groundwater is not utilized at the Facility for potable or any other purposes. Site-specific land use shows a hypothetical construction worker scenario as the primary direct contact exposure scenario for the property relative to the subsurface (i.e., below paved Facility areas) constituent detections. PCE in groundwater was evaluated relative to detection of 6.1 ug/L in a single grab groundwater sample at AC-BH014. The result at AC-BH014 was greater than the USEPA MCL and Utah Drinking Water Standard of 5 ug/L. However, no other sample results were found above the MCL for PCE (or for any other VOC during the Phase I and II RFI).

Potential carcinogenic risk and noncarcinogenic hazard associated with exposure to groundwater was evaluated for the construction worker using the maximum detected groundwater concentration detected at the Facility. While conservative, the maximum detected concentration was used because there is no defined plume and the available data do not warrant a statistical calculation. Detailed information regarding the calculation of carcinogenic and noncarcinogenic risks is provided in Appendix D.

Table 11 shows that the estimated carcinogenic and noncarcinogenic hazard are 1E-06 and 0.19, respectively. As indicated in Module IV.J.3, because the estimated carcinogenic risk is not greater than the UDEQ risk-based closure criteria of 1E-06 (for carcinogens) and a hazard index of one (for noncarcinogens), these findings demonstrate that concentrations detected would not be expected to present an unacceptable risk to human health.

5.4.4 HHRA Discussion and Conclusions

The HHRA indicates that the subsurface detections of PCE in soil at SWMUs 2, 3, 5, and 10 and in groundwater at SWMU 7 and the B(a)P and D(a,h)A in soil at SWMU 4 would not present an unacceptable risk for a construction worker scenario, the only potentially complete exposure pathway at the facility. The HHRA included conservative assumptions such that the estimated risk would be expected to be over-estimated as a protective measure.

Further analysis of the Phase I and Phase II RFI results shows that from a direct contact standpoint, the concentrations of PCE detected in soil would not be above generic USEPA SSLs for a long-term industrial or residential scenario. The maximum detected concentration of PCE in soil samples from the SWMUs was 300 ug/kg with a 95%UCL of 194 ug/kg compared to USEPA Region 9 Preliminary Remediation Goals (PRGs) of 1,300 ug/kg for an industrial worker scenario and 480 ug/kg for a residential scenario. The PCE levels are above the generic soil to groundwater migration SSL of 60 ug/kg (by a factor in the range of 3 to 5). The single detection of PCE above the MCL was only slightly above the standard at 6.1 ug/L versus the MCL of 5. However, Facility groundwater is not utilized for potable or other non-potable uses such that the exposure pathway is incomplete. The likelihood for migration of groundwater off-site to a depth or location where the pathway would be complete is negligible. Furthermore, incidental direct contact with groundwater was shown to be at acceptable risk levels for the most likely potential exposure pathway, that of a construction worker involved in subsurface excavation.

Further analysis of the B(a)P (maximum = 930 ug/kg) and D(a,h)A (maximum = 370 ug/kg) detected at SWMU 4 shows that the detections were found at subsurface samples, at 3.5-4.5 feet bgs. The levels detected were well below soil to groundwater migration SSLs (i.e., 8,000 ug/kg for B(a)P and 2,000 ug/kg for D(a,h)A]. From a soils direct contact perspective, if the SWMU 4 levels for these compounds are compared to the USEPA Region 9 PRGs (developed based on an incremental cancer risk of 1E-06 and conservatively assumed exposure parameters) for industrial and residential scenarios (i.e., 210 ug/kg and 62 ug/kg, respectfully, for industrial and residential for both compounds), the estimated risks for such long-term daily exposure scenarios for the maximum concentrations would be as follows:

	Industrial	Residential
B(a)P	4.6E-06	1.5E-05
D(a,h)A	1.8E-06	5.6E-06
Total Risk	6.4E-06	2.1E-05

Considering that the area where the maximum detection of the compounds was found is below a paved/concreted covering, the likelihood of exposure is negligible. Furthermore, incidental direct contact with soil was shown to be at acceptable risk levels for the most likely potential exposure pathway, that of a construction worker involved in subsurface excavation. Such compounds are ubiquitous in environmental media from natural and anthropogenic sources and

often found in fill material. Finally, as outlined in Section 2.1.1, these compounds were likely the result of historical operations at the A&K Railroad site and unrelated to Facility operations.

5.5 CONCLUSIONS

The HHRA demonstrates that the potential risk and/or hazard for a hypothetical construction worker for the case of exposure to soil or groundwater at the Facility is below UDEQ's criterion risk levels for the protection of human health. These finding demonstrate that concentrations detected would not be expected to present an unacceptable risk to human health.

6.0 Summary and Conclusions

The Phase I and II RFI results were evaluated to assess the soil and groundwater concentrations detected at the Facility. COCs were identified by comparing the soil and groundwater data to risk-based SSLs developed by USEPA in a manner consistent with Utah Regulation R315-101-5 (for pathways including: ingestion-dermal, inhalation-volatiles, inhalation of fugitive particulates and migration to groundwater-assuming a DAF of 20 fold). The groundwater analytical results were compared to USEPA MCLs and Utah Groundwater Standards listed under R317-6-2.

Subsequent to the Phase I RFI, UDEQ indicated that a Phase II RFI evaluation and risk assessment of the specified COCs would be required to support closure of the following SWMUs:

- PCE in soil at SWMUs 2, 3, 5, and 10
- PCE in groundwater at SWMU 7
- D(a,h)A and B(a)P at SWMU 4

The following summarizes conclusions of the Phase II RFI and Risk Assessment:

- The Facility's physical geology consists of a 2.0 to 3.5 feet thick layer of gravelly sand and sandy gravel mixtures or concrete. Underlying the fill material are several native soil types including clay, silt, sand, and gravel. The clay soil appears to be continuous across the entire Facility. The clayey silt appears to extend across the majority of the site; where it is absent it is replaced by the silty clay soil. The alluvial deposits do not appear to be laterally continuous.
- Groundwater is inferred to flow to the southwest to west-southwest, toward the Great Salt Lake. The unconfined shallow bearing zone, if present beneath the Facility, is reported to have a gradient of 0.01 feet/feet (Dames and Moore 1989, USGS 1972). The water table across much of the site is relatively flat, and occurs within silt or silty sand deposits beneath the fill. The depth to groundwater is typically between 3 and 6 feet below grade. The results indicate groundwater is associated with silt or silty sand deposits. The discontinuous nature of these deposits and the sporadic groundwater encountered is typical of perched conditions.
- There are no significant surface water drainages in the vicinity of the Facility. The largest stream in the area is the Weber River, located about four miles to the north and east of the Freeport Center. Surface water that falls as precipitation infiltrates to the subsurface, or is captured in stormwater collection systems for discharge in accordance with a UDEQ permit.
- The Quality Assurance Review indicated that the data are acceptable for project use.
- PCE was the only VOC detected in soils above the generic SSLs. PCE was detected at concentrations ranging from 100 to 300 ug/kg that were above the generic SSL of 60 ug/kg for migration to groundwater in four soil borings: AC-BH002, AC-BH005, AC-BH013, and AC-BH016 (Figure 11). PCE did not exceed the ingestion-dermal or inhalation SSLs in any soil samples. The PCE detected at 4 to 5 feet below grade in AC-

BH002 was near the secondary containment sump drain line in the product storage tank farm/waste storage tank areas (SWMU #2/8). The PCE detected at 5 to 6 feet below grade in AC-BH005 was at the area beneath the easternmost floor drain beneath the truck rack canopy in product loading/unloading area (SWMU #3). The PCE detected at 12 feet below grade in AC-BH015 was beneath the easternmost former sump associated with the railcar unloading area, SWMU #5. The PCE detected at 3.5 feet below grade in AC-BH016 was at the central floor drain within the hazardous waste storage area (SWMU #10).

- Results of Phase II RFI resampling at AC-BH002 in 2005 showed no detection of PCE. Four additional soil borings completed in the Phase II RFI at AC-BH005 and AC-BH-13 showed detections below and/or very near to the detection level.
- The results of the HHRA for PCE in soil are less than UDEQ's risk criterion of 1E-06 for a risk-based closure.
- B(a)P and D(a,h)A were the only SVOC compounds detected in soil above the generic SSLs. The two compounds were detected above the generic soil ingestion-dermal SSLs in one soil sample from the Container Filling Area (SWMU #4 – Boring AC-BH007) at 930 ug/kg B(a)P and 370 ug/kg D(a,h)A. The generic ingestion-dermal SSLs are 200 ug/kg for both substances. The detections were at 3.5 to 4.5 feet below grade in AC-BH008 within SWMU 4 near the central floor drain (Figure 12). These compounds were below detection in all other Phase I samples (no further samples were collected during the Phase II RFI). The results of the HHRA for B(a)P and D(a,h)A showed estimated risks below UDEQ's criterion risk level of 1E-06 for a risk-based closure.
- No VOCs were detected in groundwater above MCLs with the exception of one sample, which exceeded the MCL for PCE. PCE was detected at SWMU 7 in a single grab groundwater sample collected from AC-BH014 at a concentration of 6.1 ug/L, slightly above the 5.0 ug/L MCL. During the Phase II RFI, groundwater samples were obtained at boring BH-E, completed approximately 40 feet downgradient from AC-BH014 in 2005. The concentration of PCE was below detectable levels.
- There is little to no potential for off-site environmental degradation from the Facility and there is no evidence that releases or spills from the Facility have migrated off-site. Facility activities are constrained by the fenced enclosure. Additionally, exposure relative to the constituents detected at the Facility are mitigated by their subsurface location and the concrete capping over the majority of the Facility where activities occur. The hydrogeological conditions which exist at the Facility serve to further limit migration and exposure pathways.
- There are no designated wetlands near the Facility (USFWS, 1997). The primary wetland and waterfowl habitat in the area is adjacent to the east shore of the Great Salt Lake. Some intermittently saturated marshlands are approximately three miles west of the Facility. The Howard Slough State Waterfowl Management Area is more than four miles west of the Facility.
- There are no known special status or sensitive species within one mile of the Facility although a number of TES species are known to occur or nest along the Front Range of the Wasatch Mountains, including the bald eagle (*Haliaeetus leucocephalus*),

(Woodward-Clyde, 1997). The nearest known nesting site for the only Utah sensitive species known to occur in the area (the western snowy plover) is about eight miles west of the Facility.

- There is little potential for human exposure to constituents detected in soil. Most of the property has been covered with concrete or buildings, so the potential for exposure to Facility employees or visitors is mitigated. Also, there are no residential areas in the immediate vicinity. The closest residence is estimated to be ¾ mile from the Facility.
- Human exposure to constituents detected in groundwater at the Facility is unlikely since there are no shallow, domestic-use groundwater wells in close proximity to the Facility. Only two wells withdraw water from the shallow unconfined aquifer and they are over ½ mile downgradient of the Facility. The discontinuous nature of the alluvial deposits further reduces likelihood of Facility activities impacting the wells that utilize the shallow unconfined aquifer. The remainder of the wells in the Facility vicinity (with the exception of the two irrigation wells) withdraw water from depths greater than 400 feet deep.
- The HHRA indicates that subsurface detections of PCE in soil at SWMUs 2,3,5, and 10 and in groundwater at SWMU 7 and the B(a)P and D(a,h)A in soil at SWMU 4 would not present an unacceptable risk for a construction worker scenario, the only potentially complete exposure pathway at the facility. The HHRA included conservative assumptions such that the estimated risk would be expected to be over-estimated as a protective measure. From a direct contact standpoint, the concentrations of PCE detected in soil would not be above generic USEPA SSLs for a long-term industrial or residential scenario or a construction worker scenario. As outlined in Section 2.1.1, B(a)P and D(a,h)A were likely the result of historical operations at the A&K Railroad site and unrelated to Facility operations. Nevertheless, considering that the area where the maximum detection of the compounds was found is below a paved/concreted covering, the likelihood of exposure is negligible.
- As indicated in Module IV.J.3, because estimated carcinogenic risk is not greater than 1E-06 and the estimated noncarcinogenic hazard is no greater than one, constituents in soil and groundwater underlying the property meets the criteria for a no further action designation for closure of the Facility's SWMUs.

In summary, the limited detections of analytes in the Facility soil and groundwater were only marginally above the conservative and generic SSLs and have been determined to be below UDEQ's criterion risk levels. The subsurface depth to the detections, the discontinuous geologic and hydrogeologic conditions, and the concrete covering over the majority of the Facility prevent and mitigate potential exposure pathways. No evidence of offsite impacts was encountered. Overall, the investigation demonstrated that site conditions at the Facility do not pose an unacceptable risk to human health or the environment.

7.0 Recommendations

Based on the results of the Phase I and II RFI and Facility-specific human health risk assessment, no further action is warranted for the Facility. The recommendations are planned to support the no further action designation and to support a request for closure of this investigation:

- Complete a no further action (NFA) petition for the open SWMUs per Ashland's RCRA permit – Module IV (Section IV.H: part IV.H.1).
- Obtain a waiver of the ecological assessment requirement based on the lack of sensitive species and habitats as described in Section 2.

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Table 1
Downgradient Well Summary
Ashland Inc. / Clearfield DSO

Map Number	Owner	Use	Depth (feet bgs)
1	LDS Church	Domestic Stockwatering	115
2	Christine Medler	Irrigation	30
3	Michael Moyes	Irrigation	20
4	City of Syracuse	Municipal Supply	777
5	City of Syracuse	Municipal Supply	943
6	City of Syracuse	Municipal Supply	400
7	City of Syracuse	Municipal Supply	628

Notes:
bgs = Below ground surface

Table 2
Volatile Organic Compound Parameter List, Quantification Limits, and Methods
Ashland Inc. / Clearfield DSO

Analyte	Soil (µg/kg)			Water (µg/l)		
	MDL	Proposed RL	Actual RL Range	MDL	Proposed RL	Actual RL Range
Tetrachloroethene	1.29	5	5.4 - 300	0.36	1	1 - 1

Method = USEPA SW-846 Method 8260B

Specific detection and reporting limits are highly matrix dependent. The method detection limits (MDL) and reporting limits (RL) listed herein are provided by STL of Arvada, Colorado, for guidance and may not always be achievable.

Reporting limits listed for soil are based on wet weight.

Reporting limits calculated by the laboratory for soil, calculated on dry weight basis, will be higher.

-- Compound not analyzed for in this matrix.

Table 3
Semivolatile Organic Compound Parameter List, Quantification Limits, and Methods
Ashland Inc. / Clearfield DSO

Analyte	Soil (µg/kg)			Water (µg/l)		
	MDL	Propoded RL	Actual RL Range	MDL	Proposed RL	Actual RL Range
Benzo(a)pyrene	47.2	330	330 - 420	1.73	10	10 - 250
Dibenz(a,h)anthracene	51.7	330	330 - 420	2.21	10	10 - 250

Method = USEPA SW-846 Method 8270C

Specific detection and reporting limits are highly matrix dependent. The detection limits and reporting limits listed herein are provided by STL of Arvada, Colorado, for guidance and may not always be achievable.

Reporting limits listed for soil are based on wet weight.

Reporting limits calculated by the laboratory for soil, calculated on dry weight basis, will be higher.

-- Compound not analyzed for in this matrix.

Table 4
Summary of Physical Soil Data
Ashland Inc. / Clearfield DSO

Soil Boring Location	Depth Below Ground (feet)	% Gravel	% Sand	%Silt	% Clay	Unified Soil Classification System	% Solids
BH003	4.5-6.0	47.3	45.1	5.4	2.2	GM	96.2
BH011	6.0-7.0	0.0	0.6	56.3	43.1	CL	84.1
BH015	10.0-12.0	1.0	24.2	43.8	31.0	CL	84.2

Table 5
Soil Boring Headspace Screening Results Summary
Ashland Inc. / Clearfield DSO

	Soil Boring Location	Depth Below Ground (feet) 0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16
Phase II RFI	BH-A	0.0	4.0	9.5	NA	28.0	32	--	--
	BH-B	0.0	1.0	4.0	3.8	--	--	--	--
	BH-C	NA	0.8	NA	5.1	30.0	50	--	--
	BH-D	0.0	3.1	NA	5.8	40.0	135	--	--
	BH-E	3.8	2.5	3.1	4.5	8.0	4.1	10.1	5.1
	BH002 (2005)	3.1		4.1	5.1	25.1	--	--	--

Headspace readings were assigned to the closest two foot interval.
Headspace readings in parts per million.
NA = No headspace reading available for the interval.
-- = Interval is deeper than boring termination.

Table 6
Soil Analytical Results Summary
Volatile Organic Compounds
Ashland Inc. / Clearfield DSO

Analyte	Generic (a) SSSLs for Residential Scenario				Generic (a) SSSLs for Commercial/Industrial Scenario: Outdoor Workers				Phase I RFI																		Phase II RFI									
	Ingestion-Dermal	Inhalation of Volatiles	Inhalation of Fugitive Particulates	Migration to Groundwater DAF*20	Ingestion-Dermal	Inhalation of Volatiles	Inhalation of Fugitive Particulates	Migration to Groundwater DAF*20	BH001	BH002	BH003	BH003	BH004	BH005	BH006	BH007		BH008	BH009	BH010	BH011	BH012	BH012	BH013	BH013	BH014	BH015	BH016	BH016	Trip Blank 1	Trip Blank 2	Equip Rinsate #2	BH-A	BH-A	BH-B	BH-B	BH-C	BH-D	BH002	BH002	Trip Blank	Field Blank
VOCs (ug/kg)									4.5'-6'	4'-5'	2'-4'	6'	2.5'-4.5'	5'-6'	2.5'-3.5'	3.5'-4.5'	FD-2	3.5'-4.5'	3'-4'	4'-6'	6'-7'	6'-7.5'	9'	3.5'-4'	12'	4'-5'	5'-6'	3.5'	8'	ug/L	ug/L		1'-2'	5'-6'	:H-9A-05(	1'-2'	5'-6'	11'-12'	11'-12'	4'-5'	7'-8'	6/24/2005	6/24/2005
Tetrachloroethene	1,000a,b	1,000 b	NE	60	6,000 a,b	2,000 b	NE	60	<5.6	**100 J**	<5.4	<9.5	<6.1	**300**	<5.9	4.1 J	3.8 J	<6.1	1.9 J	53 J	<6.0	<6.1	<6.1	5.8	**290 J**	<6.2	NA	**200 J**	<8.0	<1.0	<1.0	<1.0	0.28 J	<0.20	<0.20	0.20 J	<0.21	<33	<33	<0.21	<0.21	<0.20	<0.20

Notes:
Bold indicates the exceedance of a soil screening level (SSL).
a = No dermal absorption data available. Calculated based on ingestion data only.
b = Calculated values correspond to a cancer risk of 1 in 1,000,000.
NE = Not established
NA = Not analyzed
B = Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J = Estimated result. Result is less than the reportable limit.
DAF*20 = Dilution Attenuation Factor times 20.
Field Blanks, Trip Blanks, and Equipment Rinsate Blanks are reported in ug/L.

Table 7
Soil Analytical Results Summary
Semivolatile Organic Compounds
Ashland Inc. / Clearfield DSO

Analyte	Generic (a) SSSLs for Residential Scenario				Generic (a) SSSLs for Commercial/Industrial Scenario: Outdoor Workers				BH001	BH002	BH003	BH003	BH004	BH005	BH006	BH007		BH008	BH009	BH010	BH011	BH012	BH012	BH013	BH013	BH014	BH015	BH016	BH016	Trip Blank 1	Trip Blank 2	Equip Rinsate #2
	Ingestion-Dermal	Inhalation of Volatiles	Inhalation of Fugitive Particulates	Migration to Groundwater DAF*20	Ingestion-Dermal	Inhalation of Volatiles	Inhalation of Fugitive Particulates	Migration to Groundwater DAF*20	4.5'-6'	4'-5'	2'-4'	6'	2.5'-4.5'	5'-6'	2.5'-3.5'	3.5'-4.5'	FD-2	3.5'-4.5'	3'-4'	4'-6'	6'-7'	6'-7.5'	9'	3.5'-4'	12'	4'-5'	5'-6'	3.5'	8'	ug/L	ug/L	
SVOCS (ug/kg)																																
Benzo (a) pyrene	60 b	a	NE	8,000	200 b	a	NE	8,000	<330	<330	<350	NA	<330	<330	<330	<330	<330	930	<330	<400	<420	NA	NA	NA	NA	<390	NA	190 J	NA	NA	NA	<10
Dibenz (a,h) anthracene	60 b	a	NE	2,000	200 b	a	NE	2,000 b	<330	<330	<350	NA	<330	<330	<330	<330	<330	370	<330	<400	<420	NA	NA	NA	NA	<390	NA	<370	NA	NA	NA	<10

Notes:
Bold indicates the exceedance of a soil screening level (SSL).
a = No toxicity data for that route of exposure.
b = Calculated values correspond to a cancer risk of 1 in 1,000,000.
NE = Not established
NA = Not analyzed
J = Estimated result. Result is less than the reportable limit.
DAF*20 = Dilution Attenuation Factor times 20.

Table 8
Groundwater Analytical Results Summary
Volatile Organic Compounds
Ashland Inc. / Clearfield DSO

Analyte	USEPA MCL	Phase I RFI										Phase II RFI	
		BH001	FD#3	BH003	BH007	BH014	BH014	BH014	BH015	Trip Blank 1	Trip Blank 2	Decon Water	Equip. Rinse. (BH015)	BH-E 12'-16'	BH-9E-1216
VOCs (ug/L)															
Tetrachloroethene	5	<1.0	<1.0	<1.0	0.97 J	**6.1**	NA	NA	NA	<1.0	<1.0	<1.0	NA	<0.20	<0.20

Notes:
USEPA MCL = Maximum contaminant level. The highest level of a contaminant that is allowed in drinking water.
Bold indicates an exceedance of a MCL.
TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.
NE = Not established
NA = Not analyzed
J = Estimated result. Result is less than the reportable limit.

Table 10
Risk Summary for PCE in Soil at SWMU #2, 3, 5, and 10

	Carcinogenic Risk								Noncarcinogenic Hazard							
Equation Units	CR unitless	=	Ingestion unitless	+	Dermal unitless	+	Inhalation unitless		HQ Unitless	=	Ingestion Unitless	+	Dermal unitless	+	Inhalation unitless
Tetrachloroethene	2.00E-08	=	3.70E-11	+	NA	+	1.70E-08		0.003	=	5.00E-06	+	NA	+	0.003
Soil CR	2.00E-08	=	3.70E-11	+	NA	+	1.70E-08	**Soil HI**	0.003	=	5.00E-06	+	NA	+	0.003

Notes:

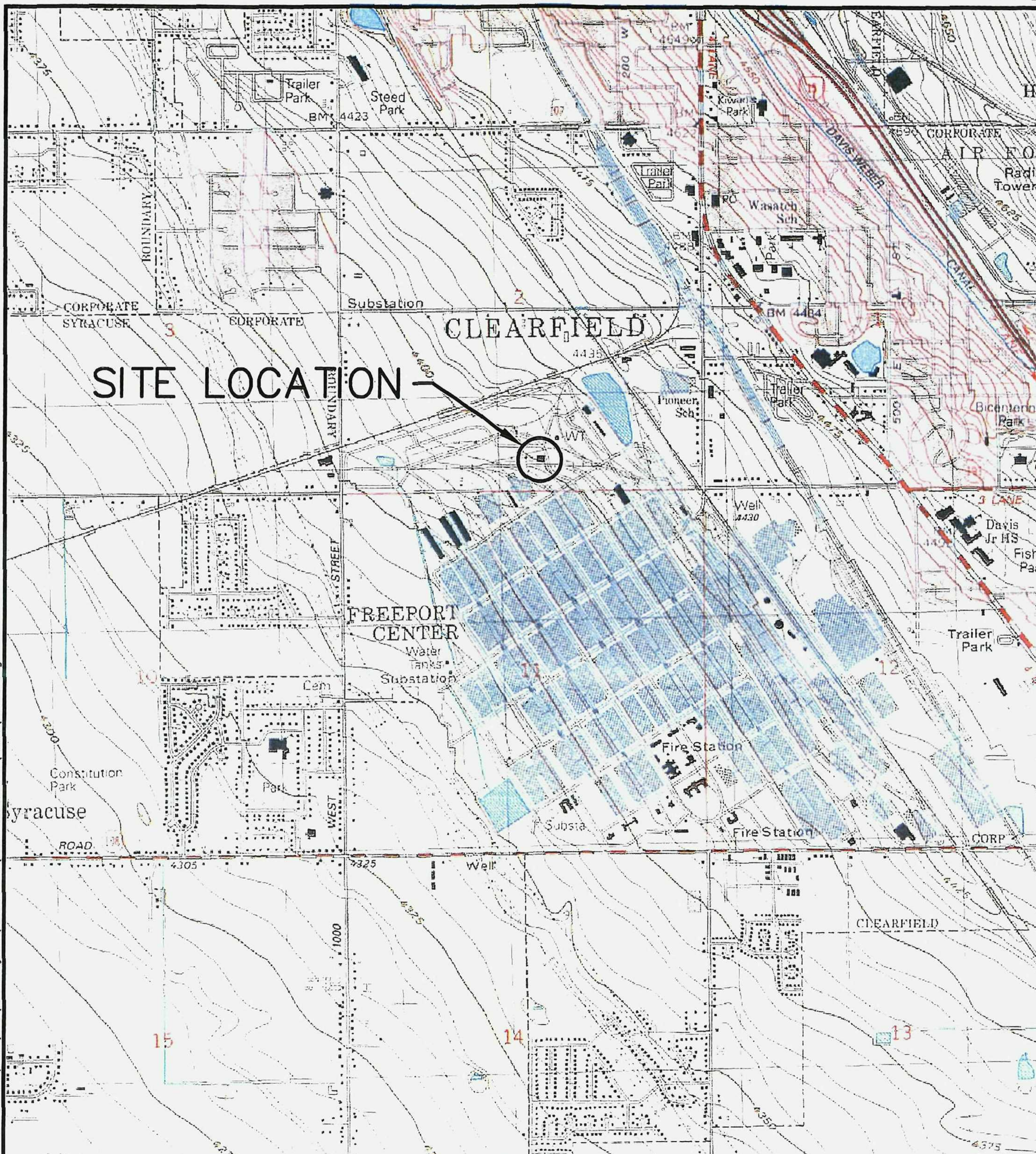
NA – Not Applicable
CR – Cancer Risk
HQ – Hazard Quotient
HI – Hazard Index

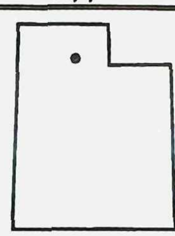
Table 11
Risk Summary for PCE in Groundwater at SWMU #7

	Carcinogenic Risk						Noncarcinogenic Hazard					
Equation Units	CR unitless	=	Ingestion Unitless	+	Dermal unitless		HQ unitless	=	Ingestion unitless	+	Dermal unitless	
Tetrachloroethene	1.00E-06	=	9.00E-11	+	1.00E-06		0.19	=	1.00E-05	+	0.19	
Groundwater CR	1.00E-06	=	9.00E-11	+	1.00E-06	**Groundwater HI**	0.19	=	1.00E-05	+	0.19	

Notes:

CR – Cancer Risk
HQ – Hazard Quotient
HI – Hazard Index





N

0 2000'

SOURCE:
USGS CLEARFIELD UTAH
QUADRANGLE 7.5-MINUTE
SERIES TOPOGRAPHIC 1991

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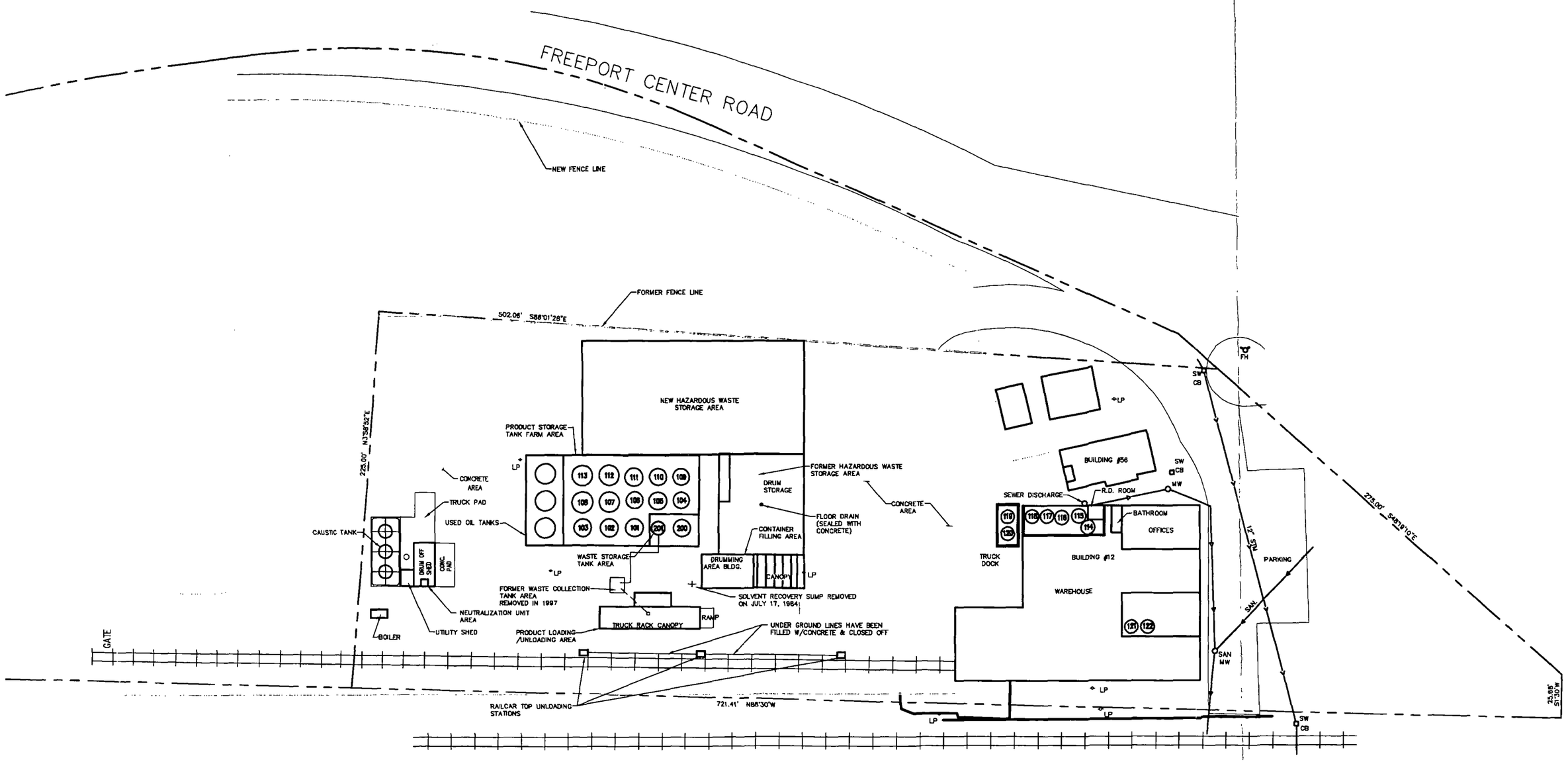
SITE LOCATION MAP
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY: JAA	DATE: 12/16/02	PROJECT NO.	FIG. NO.
CHK'D BY: BG	DATE: 12/16/02	37679619.06310	1

PLOT DATE: Jan 16, 2003 2:32pm DISK FILE NAME: (15.06) V:\URS Projects\Ashland Inc\CLFD 46546-040\CADD\FIG-01.dwg



LEGEND

- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER

0 30 60
SCALE IN FEET

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Minneapolis, MN 55415
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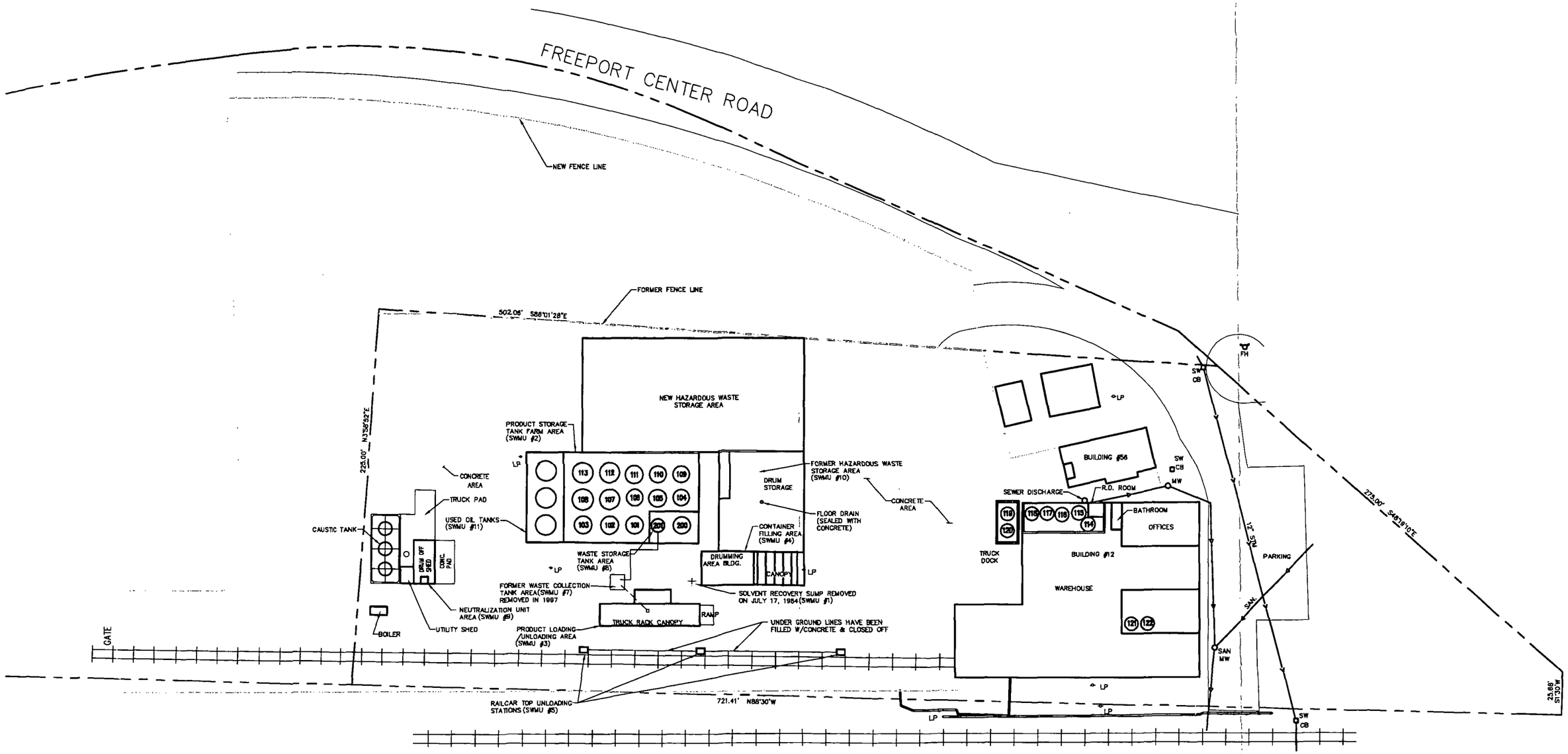
612.370.1378 Fax

SITE MAP
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY:	JAA	DATE: 01/07/03	PROJECT NO. 37679619.06310	FIG. NO. 2
CHK'D BY:	BG	DATE: 01/07/03		



LEGEND

- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER
- (#6) SWMU NUMBER

0 30 60
SCALE IN FEET

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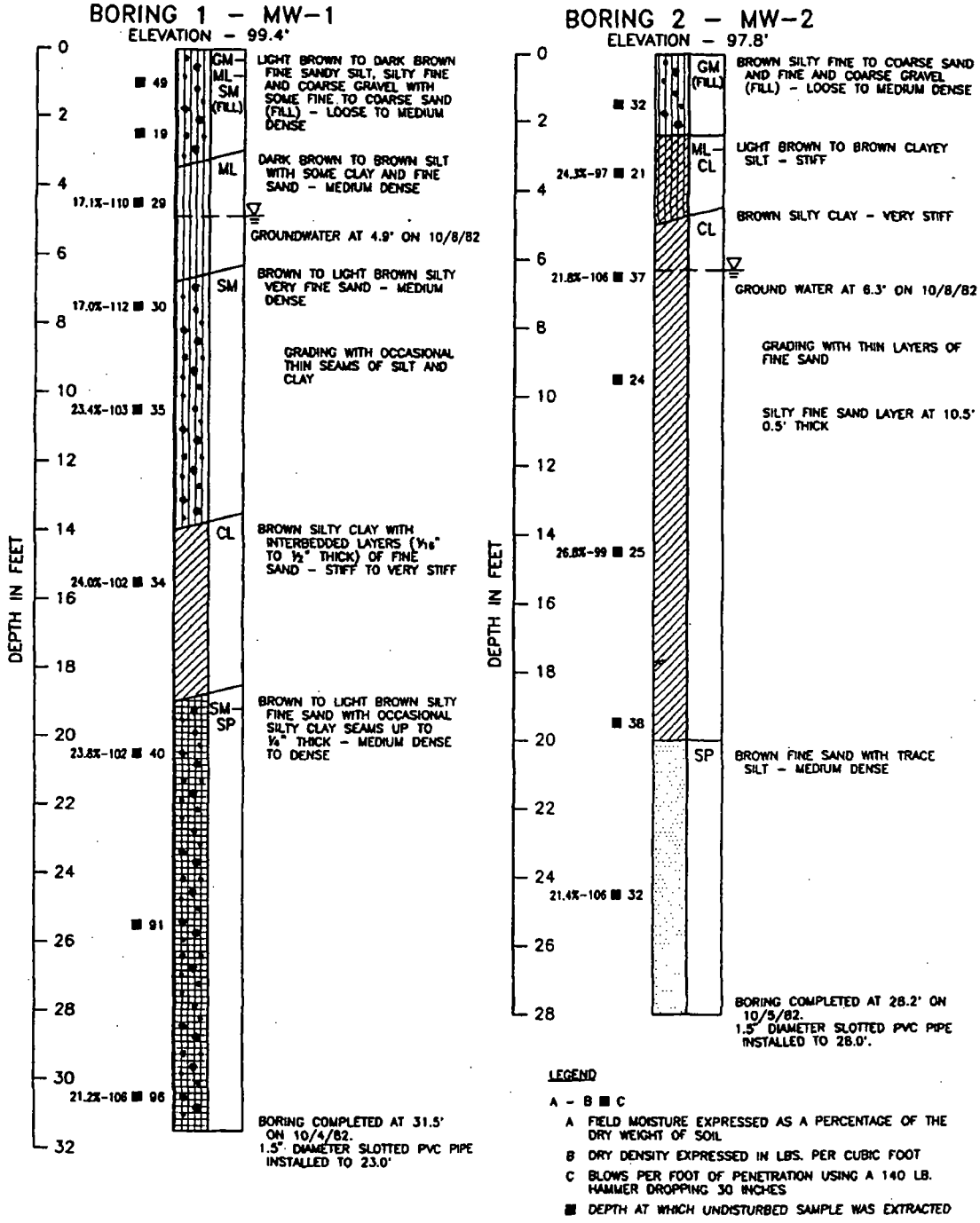
UTAH DEQ IDENTIFIED SWMUs
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY: JAA	DATE: 01/07/03	PROJECT NO.	FIG. NO.
CHK'D BY: BG	DATE: 01/07/03	37679619.06310	3



FROM: DAMES AND MOORE, 1982

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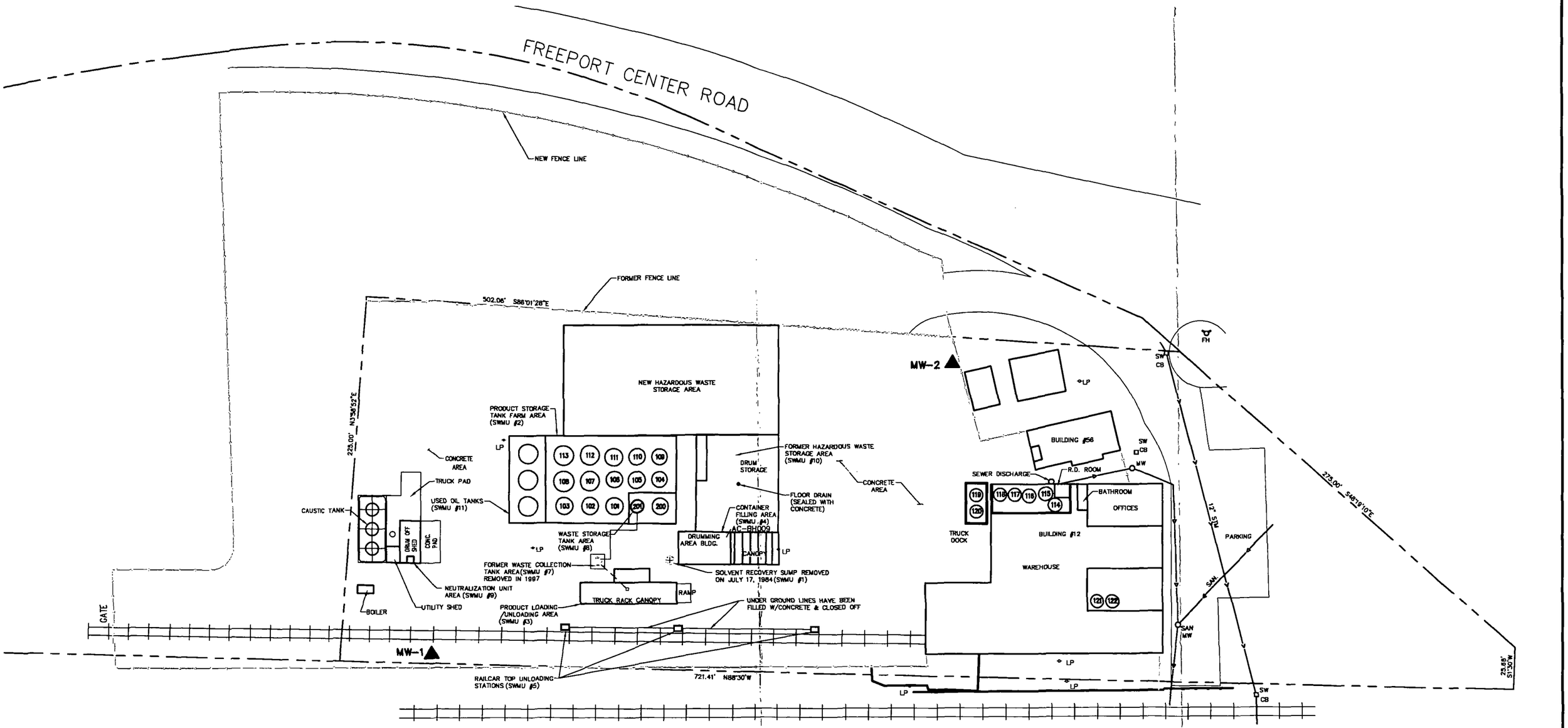
MONITORING WELL BORING LOGS
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY: JAA	DATE: 12/27/02	PROJECT NO.	FIG. NO.
CHK'D BY: BG	DATE: 12/27/02	37679619.06310	4



LEGEND

- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER
- MW-1 MONITORING WELL

0 30 60
SCALE IN FEET

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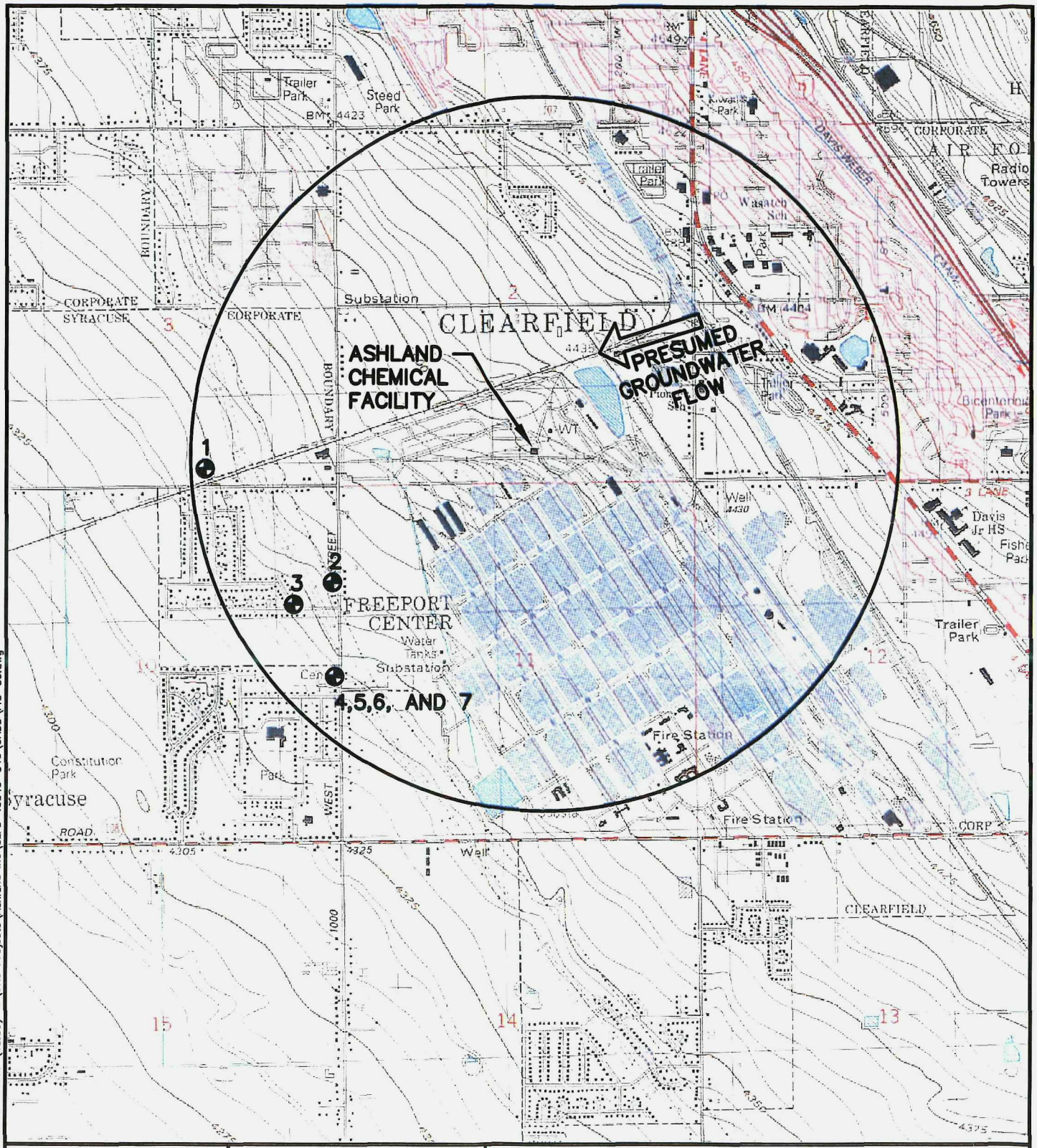
MONITORING WELL LOCATIONS
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY: JAA	DATE: 01/07/03	PROJECT NO. 37679619.06310	FIG. NO. 5
CHK'D BY: BG	DATE: 01/07/03		



N

0 2000'

SOURCE:
USGS CLEARFIELD UTAH
QUADRANGLE 7.5-MINUTE
SERIES TOPOGRAPHIC 1991

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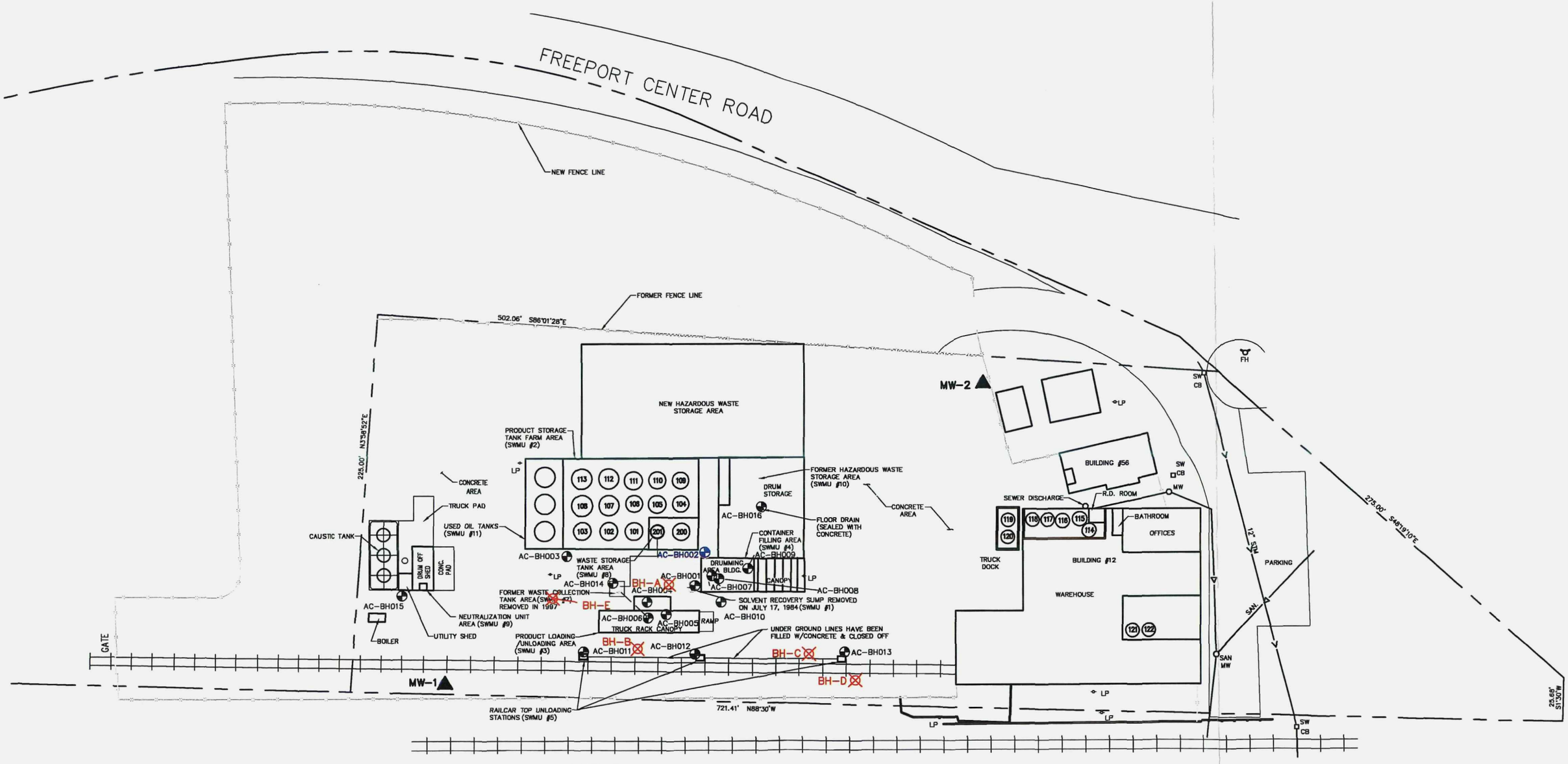
DOWNGRADIENT WELLS WITHIN ONE MILE OF ASHLAND FACILITY
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY:	JAA	DATE: 12/16/02	PROJECT NO.	FIG. NO.
CHK'D BY:	BG	DATE: 12/16/02	37679619.06310	6

PLOT DATE: Jan 24, 2003 6:43am DISK FILE NAME: (15.06) V:\URS Projects\Ashland Inc\CLFD 46546-040\CADD\FIG-06.dwg



LEGEND

- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER
- AC-BH011 — PHASE I SOIL BORING
- BH-B — PHASE II RFI SOIL BORING
- AC-BH002 — PHASE I SOIL BORING RESAMPLED
- MW-1 — MONITORING WELL

0 30 60
SCALE IN FEET

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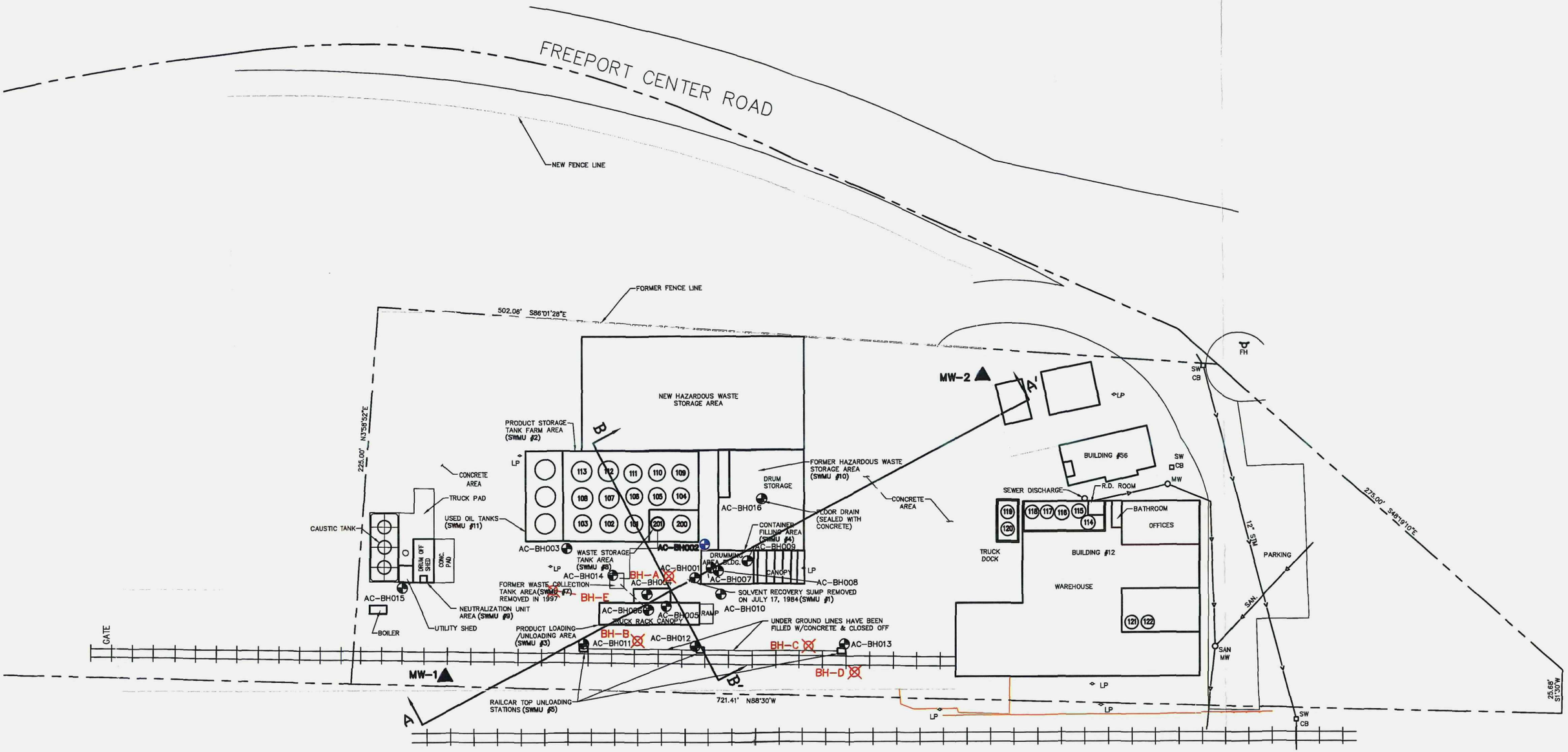
PHASE I & II RFI BORING LOCATIONS
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY:	ACH	DATE: 08/09/05	PROJECT NO.	FIG. NO.
CHK'D BY:	BG	DATE: 08/09/05	37679619.06310	7



LEGEND

- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER
- MW-1 — MONITORING WELL
- AC-BH011 — PHASE I SOIL BORING
- (#6) — SWMU NUMBER
- BH-B — PHASE II RFI SOIL BORING
- AC-BH002 — PHASE I SOIL BORING RESAMPLED

0 30 60
SCALE IN FEET

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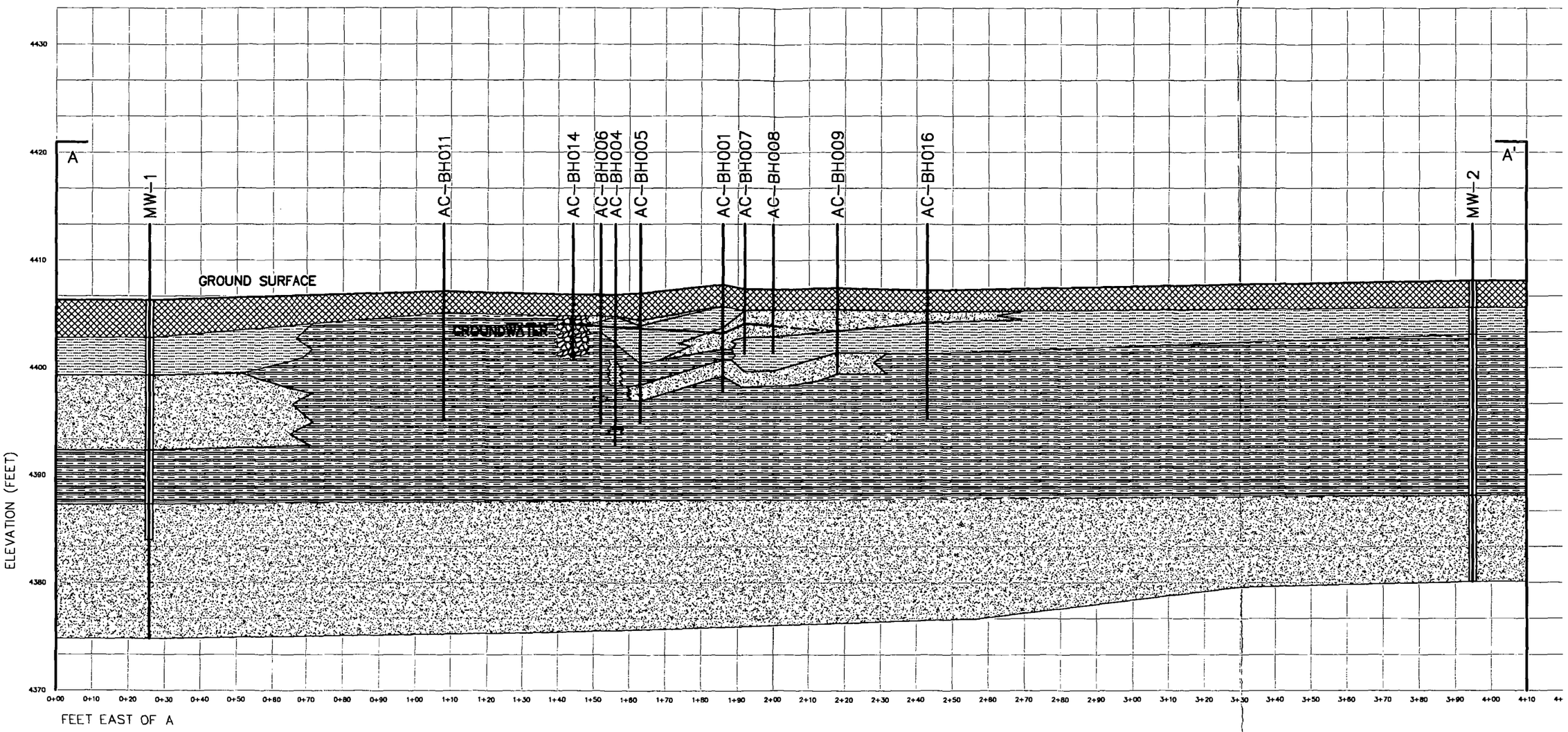
GEOLOGIC CROSS SECTION LOCATION MAP
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY:	JAA	DATE: 01/07/03	PROJECT NO.	FIG. NO.
CHK'D BY:	BG	DATE: 01/07/03	37679619.06310	8



FILL/CONCRETE
SAND
SILT
CLAY
GRAVEL

MONITORING WELL
SOIL BORING

1"=30' HORIZONTAL
1"=10' VERTICAL

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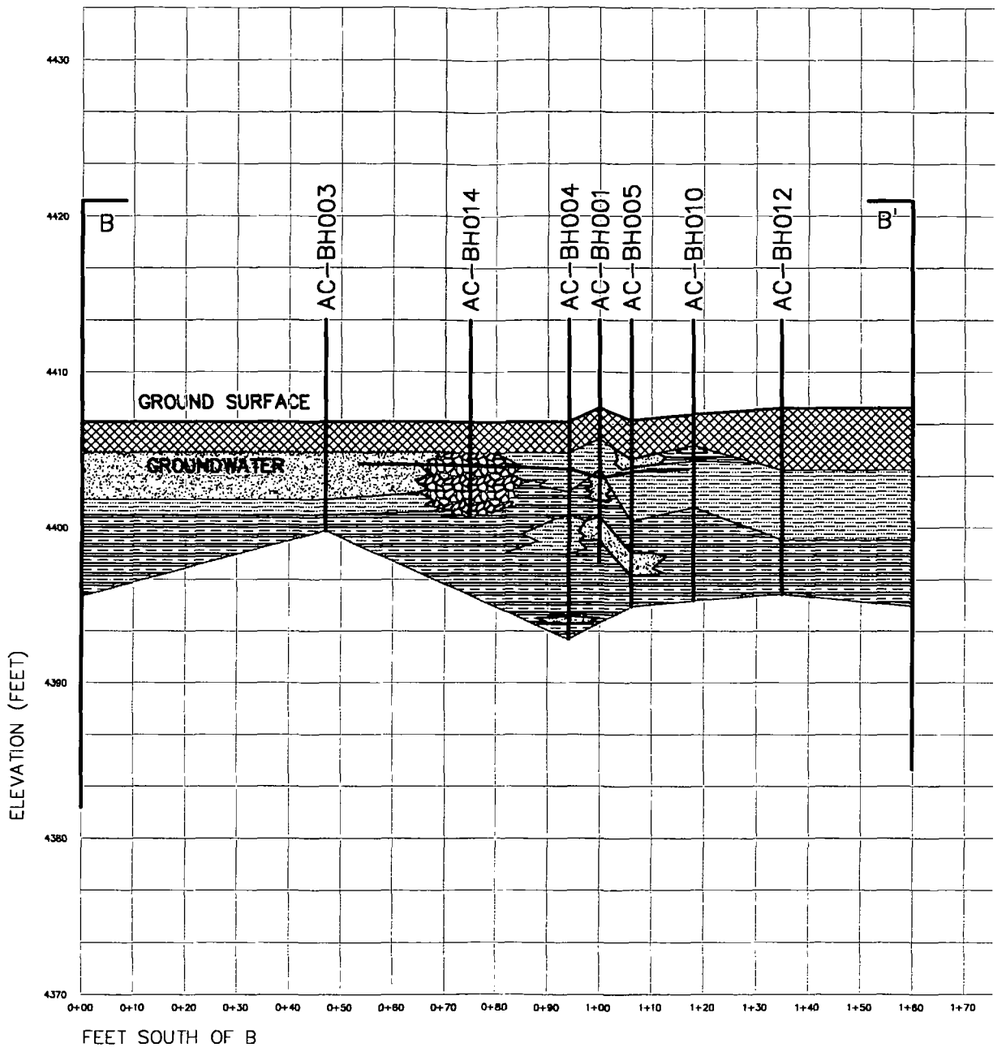
GEOLOGIC CROSS SECTION A–A'
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY: JAA	DATE: 01/07/03	PROJECT NO.	FIG. NO.
CHK'D BY: BG	DATE: 01/07/03	37679619.06310	9



FILL/CONCRETE
SAND
SILT
CLAY
GRAVEL

MONITORING WELL
SOIL BORING

1"=30' HORIZONTAL
1"=10' VERTICAL

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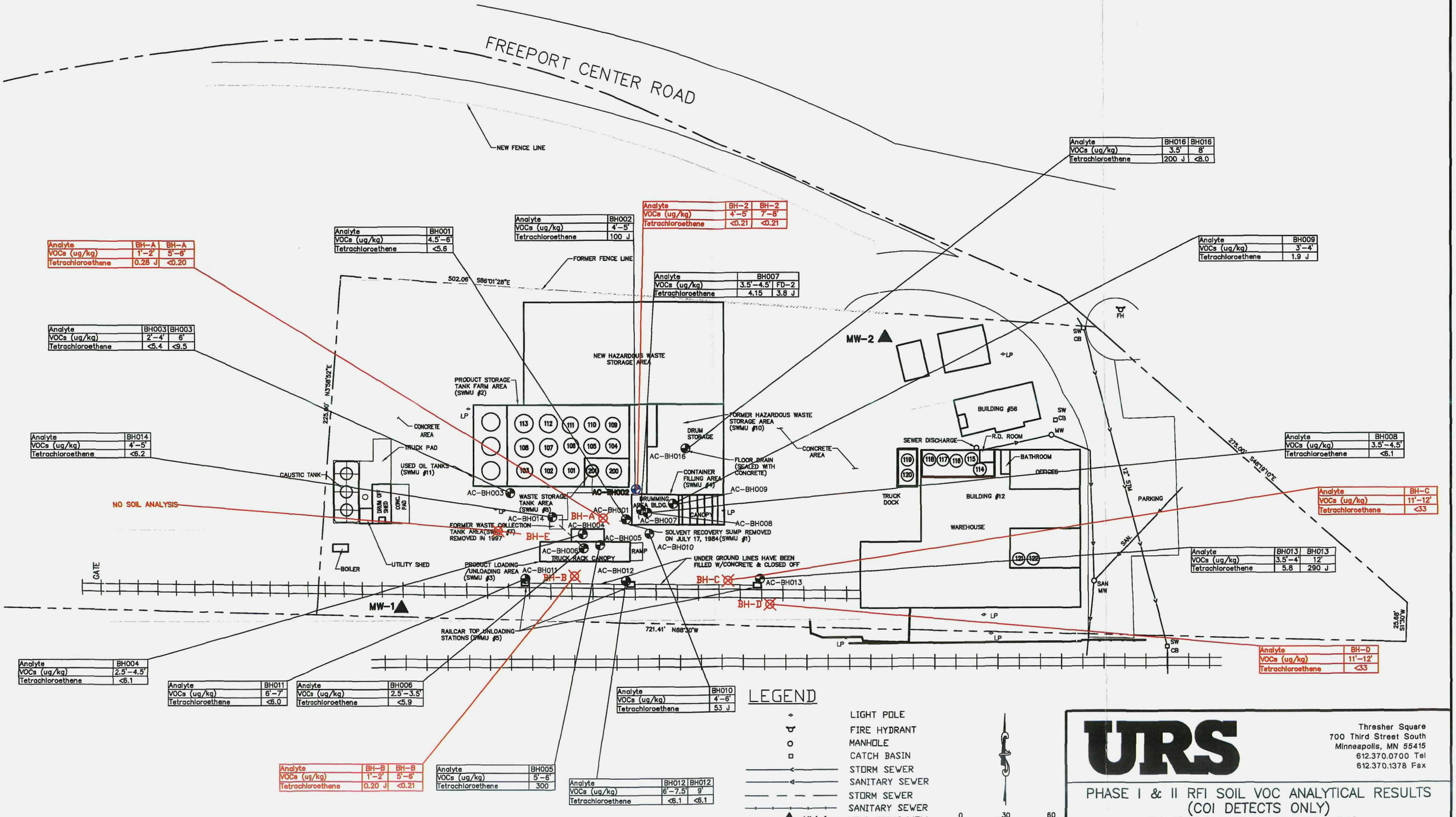
GEOLOGIC CROSS SECTION B–B'
CLEARFIELD DSO
ASHLAND INC.
CLEARFIELD, UTAH

DRN BY: JAA	DATE: 01/07/03	PROJECT NO.	FIG. NO.
CHK'D BY: BG	DATE: 01/07/03	37679619.06310	10



Analyte	BH-A	BH-A
VOCs (ug/kg)	1'-2'	5'-6'
Tetrachloroethene	0.28 J	<0.20

Analyte	BH001
VOCs (ug/kg)	4.5'-6'
Tetrachloroethene	<5.6

Analyte	BH002
VOCs (ug/kg)	4'-5'
Tetrachloroethene	100 J

Analyte	BH-2	BH-2
VOCs (ug/kg)	4'-5'	7'-8'
Tetrachloroethene	<0.21	<0.21

Analyte	BH007	
VOCs (ug/kg)	3.5'-4.5'	FD-2
Tetrachloroethene	4.15	3.8 J

Analyte	BH016	BH016
VOCs (ug/kg)	3.5'	8'
Tetrachloroethene	200 J	<8.0

Analyte	BH009
VOCs (ug/kg)	3'-4'
Tetrachloroethene	1.9 J

Analyte	BH003	BH003
VOCs (ug/kg)	2'-4'	6'
Tetrachloroethene	<5.4	<9.5

Analyte	BH014
VOCs (ug/kg)	4'-5'
Tetrachloroethene	<6.2

Analyte	BH008
VOCs (ug/kg)	3.5'-4.5'
Tetrachloroethene	<6.1

Analyte	BH-C
VOCs (ug/kg)	11'-12'
Tetrachloroethene	<33

Analyte	BH013	BH013
VOCs (ug/kg)	3.5'-4'	12'
Tetrachloroethene	5.8	290 J

Analyte	BH-D
VOCs (ug/kg)	11'-12'
Tetrachloroethene	<33

Analyte	BH004
VOCs (ug/kg)	2.5'-4.5'
Tetrachloroethene	<6.1

Analyte	BH011
VOCs (ug/kg)	6'-7'
Tetrachloroethene	<6.0

Analyte	BH006
VOCs (ug/kg)	2.5'-3.5'
Tetrachloroethene	<5.9

Analyte	BH010
VOCs (ug/kg)	4'-6'
Tetrachloroethene	53 J

Analyte	BH-B	BH-B
VOCs (ug/kg)	1'-2'	5'-6'
Tetrachloroethene	0.20 J	<0.21

Analyte	BH005
VOCs (ug/kg)	5'-6'
Tetrachloroethene	300

Analyte	BH012	BH012
VOCs (ug/kg)	6'-7.5'	9'
Tetrachloroethene	<6.1	<6.1

LEGEND

- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER
- MW-1 MONITORING WELL
- AC-BH011 PHASE I SOIL BORING
- (#6) SWMU NUMBER
- PHASE II SOIL BORINGS
- AC-BH002 PHASE I SOIL BORING RESAMPLED

0 30 60
SCALE IN FEET

J = Estimated result. Result is less than the reportable limit.
Phase II RFI analytical results shown in red.

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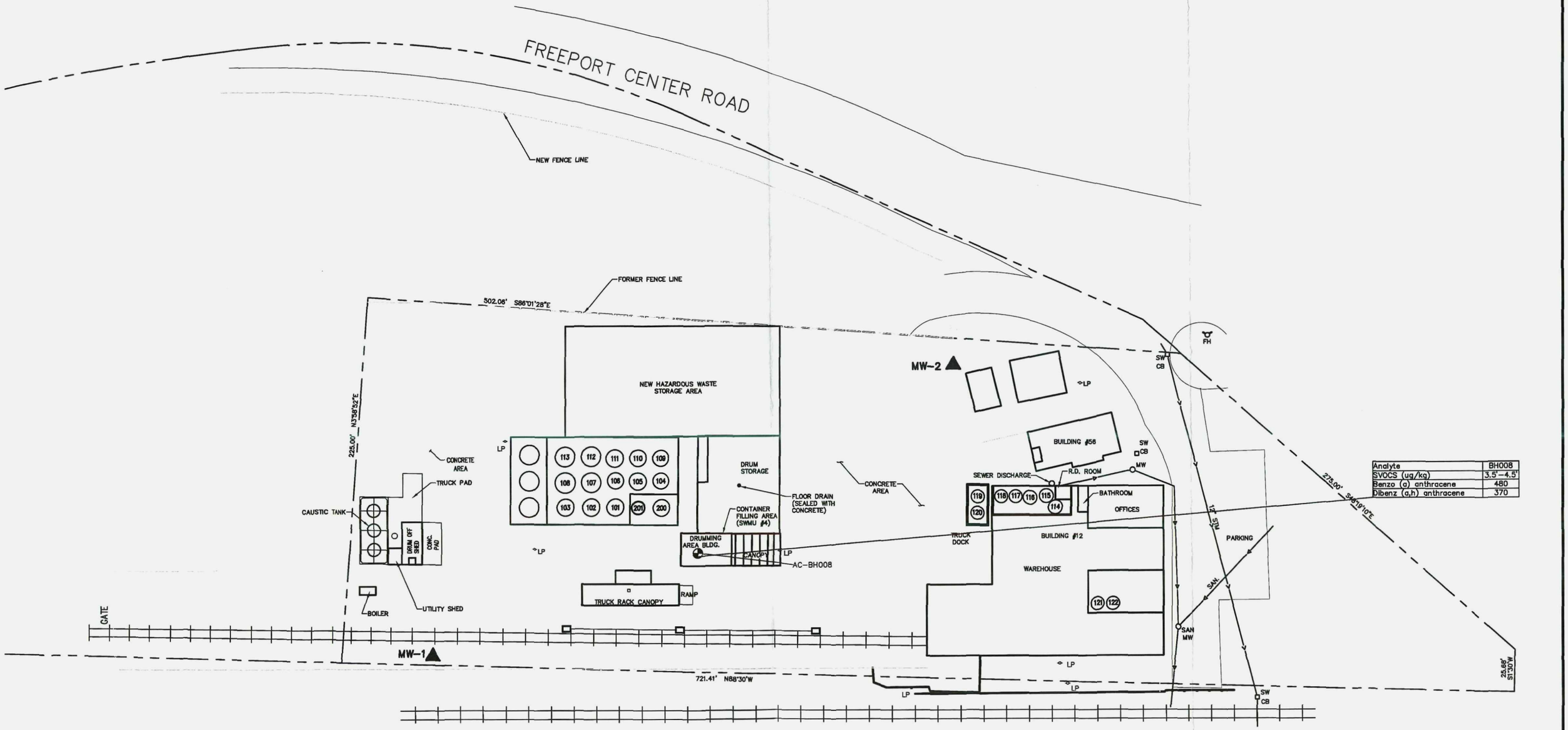
PHASE I & II RFI SOIL VOC ANALYTICAL RESULTS (COI DETECTS ONLY) CLEARFIELD DSO ASHLAND INC. CLEARFIELD, UTAH

DRN BY:	JAA	DATE: 01/07/03	PROJECT NO.	FIG. NO.
CHK'D BY:	BG	DATE: 01/07/03	37679619.06310	11



Analyte	BH008
SVOCS (ug/kg)	3.5'-4.5'
Benzo (a) anthracene	480
Dibenz (a,h) anthracene	370

LEGEND

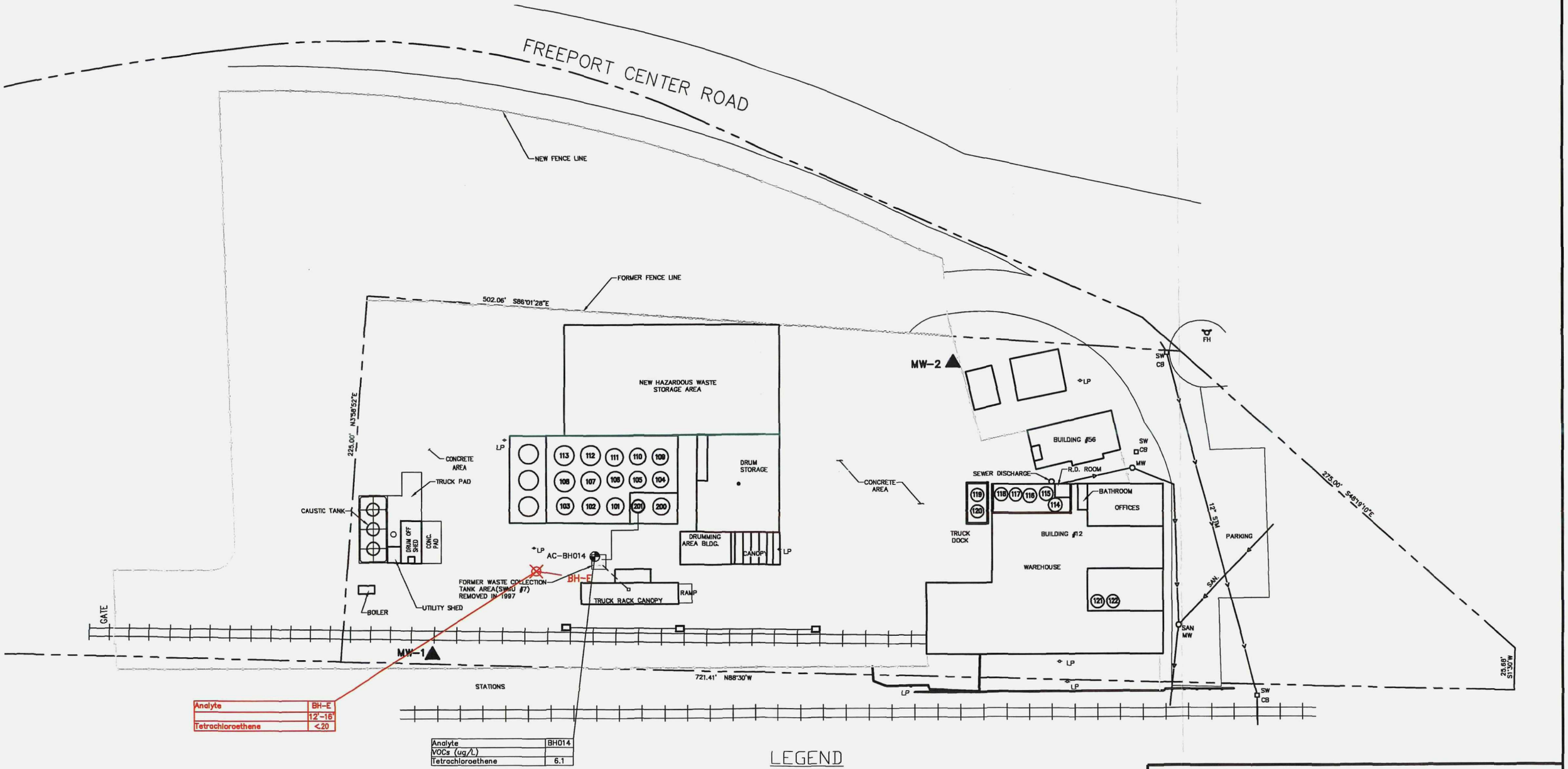
- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER
- MW-1 — MONITORING WELL
- AC-BH011 — PHASE I SOIL BORING
- (#6) — SWMU NUMBER

0 30 60
SCALE IN FEET

URS
Thresher Square
700 Third Street South
Minneapolis, MN 55415
612.370.0700 Tel
612.370.1378 Fax

PHASE I & II RFI SOIL SVOC ANALYTICAL RESULTS (COI DETECTS ONLY) CLEARFIELD DSO ASHLAND INC. CLEARFIELD, UTAH

DRN BY:	JAA	DATE: 01/07/03	PROJECT NO.	FIG. NO.
CHK'D BY:	BG	DATE: 01/07/03	37679619.06310	12



Analyte	BH-E
	12'-16'
Tetrachloroethene	<.20

Analyte	BH014
VOCs (ug/L)	
Tetrachloroethene	6.1

LEGEND

- LIGHT POLE
- FIRE HYDRANT
- MANHOLE
- CATCH BASIN
- STORM SEWER
- SANITARY SEWER
- STORM SEWER
- SANITARY SEWER
- MW-1 — MONITORING WELL
- AC-BH011 — PHASE I SOIL BORING
- (#6) — SWMU NUMBER
- PHASE II SOIL BORING
- AC-BH002 — PHASE I SOIL BORING RESAMPLED

0 30 60
SCALE IN FEET

B = Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J = Estimated result. Result is less than the reportable limit.
Phase II RFI analytical results shown in red.

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PHASE I & II RFI GROUNDWATER VOC ANALYTICAL RESULTS (COI DETECTS ONLY) CLEARFIELD DSO ASHLAND INC. CLEARFIELD, UTAH

DRN BY:	JAA	DATE: 01/07/03	PROJECT NO.	FIG. NO.
CHK'D BY:	BG	DATE: 01/07/03	37679619.06310	13

APPENDIX A
Soil Boring Logs

URS

ENVIRONMENTAL BORING LOG

CLIENT: Ashland	JOB NO.: 37679619	LOCATION: Clearfield, UT	
PROJECT: Clearfield	DRILLING METHOD: Direct Push		BORING NO. AC-BH-002
LOGGED BY: Lawrence Cannor	CHECKED BY: D. Stockwell		SHEET 1 OF 1
DRILLING CONTR.: Earth Probe			
DRILLER: Pat Casey	EQUIP.: Hand Held Geoprobe	SAMPLING METHOD: Macro Core	DRILLING START TIME: 12:15 / FINISH TIME: 13:00
BORING DEPTH: 9			
GROUND SURFACE ELEVATION:	WATER LEVEL		DATE: 6/24/05 / DATE: 6/24/05
DATUM:	TIME		
COMMENTS:	DATE		
	CASING DEPTH		

SAMPLER TYPE	SAMPLE NO / SAMPLE DEPTH	INCHES DRIVEN / INCHES RECOVERED	PID (ppm)	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS / MATERIAL DESCRIPTION	WELL DIAGRAM
CS	0 / 1	36 / 18	3.1		1		Gravelly silty sand fill, reddish brown, (2.5 YR 4/6), about 55% fine to coarse grained sand, 35% fines and 10% angular gravel, moist, no odor.	
	3				2			
CS	5	36 / 12	4.1		3			
	6				4			
CS	6.5	48 / 36	5.1	SM	5			
					6			
CS	8.5 / 9		25.1	CL	7		Gravelly silty sand (SM), brown (10 YR 4/3), about 5% gravel, 60% fine to medium grained sand and 5% fines, well graded, wet, no odor. Silty clay (CL), brown (10 YR 4/3), mottled orange, stiff, moist, very slight HC odor.	
					8			
					9		EOB @ 9'.	
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			

URS

ENVIRONMENTAL BORING LOG

CLIENT: Ashland		JOB NO.: 37679619	LOCATION: Clearfield, UT		
PROJECT: Clearfield		DRILLING METHOD: Direct Push		BORING NO. BH-A	
LOGGED BY: Lawrence Cannon	CHECKED BY: D. Stockwell			SHEET 1 OF 1	
DRILLING CONTR.: Earth Probe					
DRILLER: Pat Casey	EQUIP.: Geoprobe 5400	SAMPLING METHOD: Macro Core		DRILLING START	DRILLING FINISH
BORING DEPTH: 12					
GROUND SURFACE ELEVATION:		WATER LEVEL		TIME	TIME
DATUM:		TIME		11:30	12:10
COMMENTS:		DATE		DATE	DATE
		CASING DEPTH		6/24/05	6/24/05

SAMPLER TYPE	SAMPLE NO / SAMPLE DEPTH	INCHES DRIVEN / INCHES RECOVERED	PID (ppm)	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: / MATERIAL DESCRIPTION	WELL DIAGRAM
CS	0	48 / 24	0		1–3		Gravelly sandy fill, gray (7.5 YR 6/1) about 60% fine to coarse grained sand and 40% angular gravel 1/4 to 1/2" diameter, moist, no odor.	
CS	4		4.0	ML	3–5		Sandy silt (ML) black (7.5 YR 2.5/1), moist, stiff, no odor.	
CS	6	48 / 48	9.5	SM	5–7		Clayey silty sand (SM) about 55% fine grained sand and 45% fines, dark brown (7.5 YR 3/2), moist.	
	8				7–10		Silty clay (CL), brown (10 YR 4/3), mottled orange, stiff, moist, low placticity, no odor.	
CS	10	48 / 48	28	SM	10–11		Silty sand (SM), dark brown (7.5 YR 3/2), moist, about 60% fine to medium grained sand and 40% fines, no odor.	
CS	11.5 / 12		32		11–12		Silty clay (CL), brown (10 YR 4/3), stiff, low placticity, moist, mottled orange, no odor.	
					12		EOB @ 12'.	

ENVIRONMENTAL CLEARFIELD, UT.GPJ BORING LOGS.GPJ 11/3/05

URS

ENVIRONMENTAL BORING LOG

CLIENT: Ashland	JOB NO.: 37679619	LOCATION: Clearfield, UT	
PROJECT: Clearfield	DRILLING METHOD: Direct Push		BORING NO. BH-B
LOGGED BY: Lawrence Cannon	CHECKED BY: D. Stockwell		SHEET 1 OF 1
DRILLING CONTR.: Earth Probe			
DRILLER: Pat Casey	EQUIP.: Geoprobe 5400	SAMPLING METHOD: Macro Core	DRILLING START TIME: 10:10 / FINISH TIME: 10:30
BORING DEPTH: 8			DRILLING START DATE: 6/24/05 / FINISH DATE: 6/24/05
GROUND SURFACE ELEVATION:	WATER LEVEL		
DATUM:	TIME		
COMMENTS:	DATE		
	CASING DEPTH		

SAMPLER TYPE	SAMPLE NO / SAMPLE DEPTH	INCHES DRIVEN / INCHES RECOVERED	PID (ppm)	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: MATERIAL DESCRIPTION	WELL DIAGRAM
CS	0	48 / 36	0	SM	1		Silty gravelly sand fill, light gray (7.5 YR 6/1) about 5% fines, 55% fine to coarse grained sand and 40% angular grained.	
					2		Silty sand (SM), brown (10 YR 4/3), fine to medium grained, well graded, moist.	
CS	3.5 4		1.8	ML	3		Sandy silt (ML), grayish black (5 Y 6 2.5/1), stiff, no odor, moist.	
					4			
CS	5	48 / 48	4.0	SM	5		Clayey silty sand (SM), black gray (gray 1 2.5/10), about 60% fine to medium grained sand and 40% fines, well graded, moist, mottled black.	
					6		Silty clay (CL), reddish brown (5 YR 5/4), stiff, moist, no odor.	
CS	7.5 8		3.8	CL	7			
				SM	8		Silty sand (SM), brown (10 YR 4/3), about 80% fine to medium grained sand and 20% fines, well graded, moist, no odor. EOB @ 8'.	
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			

URS

ENVIRONMENTAL BORING LOG

CLIENT: Ashland	JOB NO.: 37679619	LOCATION: Clearfield, UT	
PROJECT: Clearfield	DRILLING METHOD: Direct Push		BORING NO. BH-C
LOGGED BY: Lawrence Cannor	CHECKED BY: D. Stockwell		SHEET 1 OF 1
DRILLING CONTR.: Earth Probe			
DRILLER: Pat Casey	EQUIP.: Geoprobe 5400	SAMPLING METHOD: Macro Core	DRILLING START / FINISH
BORING DEPTH: 12			
GROUND SURFACE ELEVATION:	WATER LEVEL		TIME 9:??? / TIME 10:08
DATUM:	TIME		
COMMENTS:	DATE		DATE 6/24/05 / DATE 6/24/05
	CASING DEPTH		

SAMPLER TYPE	SAMPLE NO / SAMPLE DEPTH	INCHES DRIVEN / INCHES RECOVERED	PID (ppm)	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
							SURFACE CONDITIONS:	
CS	0 / 3 / 4	48 / 24	0.8	ML	1–4		Sandy gravel fill, light gray (7.5 YR 6/1), about 30% fine to coarse grained sand and 70% angular gravel (1/4 to 1/2" diameter). Sandy silt (ML), grayish black (5 Y 6 2.5/1), stiff, about 25% fine grained sand and 75% fines, non-plastic, moist.	
CS	7 / 8	48 / 48	5.1	CL	4–10		Sandy silty clay (CL), reddish brown (5 YR 5/4), stiff, about 5% fine grained sand and 95% fines, medium plasticity, very slight HC odor.	
CS	9	48 / 48	30					
CS	11 / 12		50	SM / CL	10–12		Clayey silty sand (SM), reddish brown (5 YR 5/4), about 55% fine sand and 45% fines, soft. Sandy silty clay (CL), reddish brown (5 YR 5/4), silt, medium plasticity, slight HC odor. EOB @ 12'.	
					13–19			

ENVIRONMENTAL CLEARFIELD UT.GPJ BORING LOGS.GPJ 11/3/05

URS

ENVIRONMENTAL BORING LOG

CLIENT: Ashland	JOB NO.: 37679619	LOCATION: Clearfield, UT	
PROJECT: Clearfield	DRILLING METHOD: Direct Push		BORING NO. BH-D
LOGGED BY: Lawrence Cannon / CHECKED BY: D. Stockwell			SHEET 1 OF 1
DRILLING CONTR.: Earth Probe			
DRILLER: Pat Casey / EQUIP.: Geoprobe 5400	SAMPLING METHOD: Macro Core		DRILLING START / FINISH
BORING DEPTH: 12			
GROUND SURFACE ELEVATION:	WATER LEVEL		TIME / TIME
DATUM:	TIME		9:10 / 9:45
COMMENTS:	DATE		DATE / DATE
	CASING DEPTH		6/24/05 / 6/24/05

SURFACE CONDITIONS:

SAMPLER TYPE	SAMPLE NO / SAMPLE DEPTH	INCHES DRIVEN / INCHES RECOVERED	PID (ppm)	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	MATERIAL DESCRIPTION	WELL DIAGRAM
CS	0	48 / 38.4	0		1		Sandy gravel fill, light gray (7.5 YR 6/1), about 30% fine to coarse grained sand and 70% angular 1/4 to 1/2" diameter gravel, no odor.	
CS	3 / 4		3.1	ML	2 3 4		Sandy silt (ML), greenish black (5 Y6 2.5/1), stiff, about 25% fine grained sand and 75% fines, non plastic, moist, no odor.	
CS	5	48 / 48	5.8		5 6			
CS	7 / 8		4.0	CL	7 8		Sandy silty clay (CL), reddish brown (5 YR 5/4), stiff, about 5% fine grained sand and 95% fines, medium plasticity, HC odor, moist.	
CS	9	48 / 48	40		9 10			
CS	11 / 12		135		11 12			
					13 14 15 16 17 18 19		EOB @ 12'.	

ENVIRONMENTAL CLEARFIELD, UT.GPJ BORING LOGS.GPJ 11/3/05

URS

ENVIRONMENTAL BORING LOG

CLIENT: Ashland	JOB NO.: 37679619	LOCATION: Clearfield, UT	
PROJECT: Clearfield	DRILLING METHOD: Direct Push		BORING NO. BH-E
LOGGED BY: Lawrence Cannon	CHECKED BY: D. Stockwell		SHEET 1 OF 1
DRILLING CONTR.: Earth Probe			
DRILLER: Pat Casey	EQUIP.: Geoprobe 5400	SAMPLING METHOD: Macro Core	DRILLING START TIME: 10:40 / FINISH TIME: 11:05
BORING DEPTH: 16			DRILLING START DATE: 6/24/05 / FINISH DATE: 6/24/05
GROUND SURFACE ELEVATION:	WATER LEVEL		
DATUM:	TIME		
COMMENTS:	DATE		
	CASING DEPTH		

SAMPLER TYPE	SAMPLE NO / SAMPLE DEPTH	INCHES DRIVEN / INCHES RECOVERED	PID (ppm)	U.S.C.S.	DEPTH IN FEET	SOIL/ROCK GRAPH	SURFACE CONDITIONS: / MATERIAL DESCRIPTION	WELL DIAGRAM
CS	0 1	48 45	3.8	ML	1 2 3		Gravelly sand fill, reddish brown (2.5 YR 4/6), well graded, moist, about 60% fine to coarse grained sand and 40% fines, no odor. Sandy silt (ML), very stiff, dark reddish brown (2.5 YR 3/1), non plastic, moist, about 80% fines and 20% fine grained sand.	
CS	4		2.5		4			
CS	5	48 48	3.1	SM	5		Silty sand (SM), dark reddish brown (2.5 YR 3/1), about 55% fine grained sand and 45% fines, moist, no odor.	
CS	7.5 8		4.5	CL	6 7 8		Silty clay (CL), brown (10YR 4/3), low plasticity, stiff, moist.	
CS	9	48 48	8	SM	9		Silty sand (SM), brown (7.5 YR 5/2), fine to medium grained, well graded, about 65% sand and 35% fines.	
CS	11 12		4.1	CL	10 11 12		Silty clay, brown (7.5 YR 5/2), mottled orange, stiff, low plasticity, moist, no odor.	
CS	13	48 48	10.1	SM	13		Silty sand (SM), brown (7.5 YR 5/2), about 70% fine to medium grained sand and 30% fines, well graded, moist, no odor.	
CS	15 16		5.1	CL	14 15 16		Silty clay (CL), brown (10 YR 4/3), mottled orange, medium stiff, low plasticity, moist, no odor.	
					16 17 18 19		EOB @ 16'.	

ENVIRONMENTAL CLEARFIELD, UT.GPJ BORING LOGS.GPJ 11/3/05

APPENDIX B
Laboratory Analytical Reports

Quality Assurance Review
Ashland Inc.
Distribution Services Organization
Clearfield, Utah
June 24, 2005

The following is the quality assurance/quality control (QA/QC) review performed for eight soil and three groundwater samples collected at the Ashland Inc. DSO facility in Clearfield, Utah June 24, 2005. Sampling personnel collected the soil samples using EnCore™ samplers using EPA Method 5035. STL Inc. of Arvada, Colorado analyzed the samples for tetrachloroethene using EPA Method 8260B. URS performed the QA/QC review following EPA guidelines (USEPA, 1999).

Holding Time Review
All samples were extracted, prepared and analyzed within the required method holding times.

Blank Review
The lab analyzed one trip blank, one equipment blank, and two laboratory method blanks with these samples. Tetrachlorethene was not detected in the trip, equipment, or laboratory method blanks above the reporting limit.

Laboratory Control Sample (LCS) Review
The laboratory spiked LCS samples with known concentrations of several VOCs. URS reviewed the LCS recoveries to evaluate analytical accuracy.

All LCS recoveries were within laboratory control limits, indicating acceptable analytical accuracy.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD)
The laboratory spiked MS/MSD samples with known concentrations of several VOCs. URS reviewed MS/MSD recoveries and relative percent differences (RPDs) to evaluate analytical accuracy and precision.

All MS/MSD recoveries and RPDs were within laboratory control limits, indicating acceptable analytical accuracy and precision, and that the sample matrix did not have an effect on the analyses.

Surrogate Review
The laboratory spiked surrogates into all field samples, trip blanks, method blanks, LCS samples, and MS/MSD samples. Samples were spiked with 4-bromofluorobenzene, 1,2-dichloroethane-d4, and toluene-d8 as surrogates. The surrogate recoveries were reviewed to evaluate sample-specific accuracy.

All surrogate recoveries were within laboratory control limits, indicating acceptable sample-specific analytical accuracy.

Mass Spectral Tune

URS reviewed the mass spectrometer to evaluate whether the analytical instrumentation was operating properly.

All mass spectral tunes meet method specific criteria.

Instrument Calibration

URS reviewed instrument calibrations to determine that the correct concentrations of tetrachloroethene was measured.

All initial and continuing calibrations were within acceptable QC limits.

Internal Standards

URS evaluated internal standard areas and retention times for tetrachloroethene to determine instrument sensitivity and stability.

All internal standard areas and retention times were within acceptable QC limits.

Reporting Limits

URS reviewed analytical data to identify results reported as non-detect at elevated reporting limits.

QA/QC Summary

The QA/QC review indicated that the data are acceptable for the purpose of evaluating potential impacts of tetrachloroethene in soil and groundwater at this site.

Reference

US Environmental Protection Agency, 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA540/R-99/008. October.

SEVERN TRENT STL

STL Denver
4955 Yarrow Street
Arvada, CO 80002

Tel: 303 736 0100 Fax: 303 431 7171
www.stl-inc.com

ANALYTICAL REPORT

Project: Ashland Chemical, Clearfield UT

STL Denver Lot #: D5F250124

Dean Stockwell

URS Corporation
700 3rd Street South
Suite 700
Minneapolis, MN 55415

STL DENVER

Patrick J. McEntee
Project Manager

July 8, 2005

Table Of Contents

CLP-Like Deliverables

Report Contents	Number of Pages

Standard Deliverables

(The Cover Letter and the Report Cover page are considered integral parts of this Standard Deliverable package. This report is incomplete unless all pages indicated in this Table of Contents are included.)

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Case Narrative

The results included in this report have been reviewed for compliance with STL's Quality Assurance/Quality Control (QA/QC) plan. The test results shown in this report meet all requirements of NELAC and any exceptions are noted below.

This report may include data with reporting limits (RLs) less than STL's standard reporting limit. These data and reporting limits are being used specifically to meet the needs of this project. Note that, data are not customarily reported to these levels without qualifiers, because they are inherently less reliable and potentially less defensible than the latest industry standards require.

Dilution factors and footnotes have been provided to assist in the interpretation of the results. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interferences or analytes present at concentrations above the linear calibration curve, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the methods indicated. A summary of quality control parameters is provided below.

Quality Control Summary for Lot D5F250124

Sample Receiving

- STL Denver received nine soils and four aqueous samples on June 25, 2005.
- The cooler temperature at receipt was acceptable at 2.6°C.
- All sample containers were received in acceptable condition.

Holding Times

- All analysis was performed within the required holding times.

Method SW846 8260B, GC/MS Volatle Organic Analysis (prep batch 5187161)

- A MS/MSD could not be analyzed for the batch due to insufficient sample volume. A Duplicate Laboratory Control Sample was analyzed to provide evidence of batch precision.
- No other anomalies were observed.

Method SW846 8260B, GC/MS Volatle Organic Analysis (prep batch 5186179)

- The percent recoveries (%R) and relative percent differences (RPD) for the client requested MS/MSD performed on sample D5F250124-008 (BH-E-1216) were within control limits.
- No anomalies were observed.

Method SW846 8260B, GC/MS Volatle Organic Analysis (prep batch 5181482)

- A MS/MSD could not be analyzed for the batch due to insufficient sample volume. A Duplicate Laboratory Control Sample was analyzed to provide evidence of batch precision.
- No other anomalies were observed.

Method MCAWW 160.3, Percent Moisture Analysis

- The RPD for the Method Duplicate performed on sample D5F250124-002 (BH-D-1112) was in control.
- No anomalies were observed.

EXECUTIVE SUMMARY - Detection Highlights

D5F250124

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
BH-D-1112 06/24/05 09:28 002				
Percent Moisture	19	0.10	%	MCAWW 160.3 MOD
BH-C-1112 06/24/05 09:52 004				
Percent Moisture	19	0.10	%	MCAWW 160.3 MOD
BH-B-0102 06/24/05 10:10 005				
Tetrachloroethene	0.20 J	5.8	ug/kg	SW846 8260B
Percent Moisture	13	0.10	%	MCAWW 160.3 MOD
BH-B-0506 06/24/05 10:18 006				
Percent Moisture	18	0.10	%	MCAWW 160.3 MOD
BH-A-0102 06/24/05 11:36 009				
Tetrachloroethene	0.28 J	5.7	ug/kg	SW846 8260B
Percent Moisture	12	0.10	%	MCAWW 160.3 MOD
BH-A-0506 06/24/05 11:40 010				
Percent Moisture	14	0.10	%	MCAWW 160.3 MOD
BH-9A-0506 06/24/05 12:00 011				
Percent Moisture	14	0.10	%	MCAWW 160.3 MOD
AC-BH002-0405 06/24/05 12:36 012				
Percent Moisture	17	0.10	%	MCAWW 160.3 MOD
AC-BH002-0708 06/24/05 12:40 013				
Percent Moisture	19	0.10	%	MCAWW 160.3 MOD

METHODS SUMMARY

D5F250124

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Percent Moisture	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Volatile Organics by GC/MS	SW846 8260B	SW846 5030B/826
Volatile Organics by GC/MS	SW846 8260B	SW846 5035

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

METHOD / ANALYST SUMMARY

D5F250124

ANALYTICAL METHOD	ANALYST	ANALYST ID
MCAWW 160.3 MOD	Duane Allee	001470
SW846 8260B	Dan Appelhans	001008
SW846 8260B	Hauqing Zhou	005417
SW846 8260B	Heather Despres	009250

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

D5F250124

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
HED62	001	TB-062405	06/24/05	
HED64	002	BH-D-1112	06/24/05	09:28
HED66	003	FB-062405	06/24/05	09:30
HED67	004	BH-C-1112	06/24/05	09:52
HED69	005	BH-B-0102	06/24/05	10:10
HED7A	006	BH-B-0506	06/24/05	10:18
HED7C	007	BH-9E-1216	06/24/05	08:00
HED7E	008	BH-E-1216	06/24/05	11:00
HED7F	009	BH-A-0102	06/24/05	11:36
HED7H	010	BH-A-0506	06/24/05	11:40
HED7K	011	BH-9A-0506	06/24/05	12:00
HED7M	012	AC-BH002-0405	06/24/05	12:36
HED7P	013	AC-BH002-0708	06/24/05	12:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

QC DATA ASSOCIATION SUMMARY

D5F250124

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	SW846 8260B		5186179	5186114
002	SOLID	SW846 8260B		5187161	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
003	WATER	SW846 8260B		5186179	5186114
004	SOLID	SW846 8260B		5187161	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
005	SOLID	SW846 8260B		5181482	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
006	SOLID	SW846 8260B		5181482	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
007	WATER	SW846 8260B		5186179	5186114
008	WATER	SW846 8260B		5186179	5186114
009	SOLID	SW846 8260B		5181482	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
010	SOLID	SW846 8260B		5181482	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
011	SOLID	SW846 8260B		5181482	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
012	SOLID	SW846 8260B		5181482	
	SOLID	MCAWW 160.3 MOD		5186520	5187106
013	SOLID	SW846 8260B		5181482	
	SOLID	MCAWW 160.3 MOD		5186520	5187106

Volatile GC/MS

CLP-Like Forms

Lot ID: D5F250124

Client: Ashland Chemical Company

Method: SW846 8260B

Associated Samples: 002, 004

Batch: 5187161

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-D-1112
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-002
Matrix:	SOLID	**Lab WorkOrder:**	HED641AC
% Moisture:	19	**Date/Time Collected:**	06/24/05 09:28
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	07/05/05 10:31
QC Batch ID:	5187161	**Date/Time Analyzed:**	07/05/05 18:47
Sample Aliquot:	6.01 g	**Instrument ID:**	E
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	33	33	310	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	102	32	133	
2037-26-5	Toluene-d8	98	25	145	
1868-53-7	Dibromofluoromethane	108	43	131	
460-00-4	4-Bromofluorobenzene	110	29	148	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-C-1112
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-004
Matrix:	SOLID	**Lab WorkOrder:**	HED671AC
% Moisture:	19	**Date/Time Collected:**	06/24/05 09:52
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	07/05/05 10:31
QC Batch ID:	5187161	**Date/Time Analyzed:**	07/05/05 19:12
Sample Aliquot:	5.9 g	**Instrument ID:**	E
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	33	33	310	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	93	32	133	
2037-26-5	Toluene-d8	92	25	145	
1868-53-7	Dibromofluoromethane	102	43	131	
460-00-4	4-Bromofluorobenzene	109	29	148	

U Result is less than the method detection limit (MDL).

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXA4BQK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	BH-D-1112	108	102	98	110	00
02	BH-C-1112	102	93	92	109	00
03	METHOD BLK. HEX3M1AA	98	90	85	92	00
04	LCS HEX3M1AC	119	112	106	117	00
05	LCSD HEX3M1AD	109	101	104	111	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(71-126)
SRG02	= 1,2-Dichloroethane-d4	(61-129)
SRG03	= Toluene-d8	(68-128)
SRG04	= 4-Bromofluorobenzene	(80-128)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXA4DQK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	BH-B-0102	104	118	97	89	00
02	BH-B-0506	99	110	98	93	00
03	BH-A-0102	101	112	95	86	00
04	BH-A-0506	100	119	89	86	00
05	BH-9A-0506	104	119	97	93	00
06	AC-BH002-0405	95	108	95	95	00
07	AC-BH002-0708	99	106	96	96	00
08	METHOD BLK. HEP4F1AA	104	111	102	88	00
09	LCS HEP4F1AC	99	107	100	91	00
10	LCSD HEP4F1AD	100	103	97	86	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(71-126)
SRG02	= 1,2-Dichloroethane-d4	(61-129)
SRG03	= Toluene-d8	(68-128)
SRG04	= 4-Bromofluorobenzene	(80-128)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXI25QK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	TB-062405	93	88	100	89	00
02	FB-062405	90	90	94	93	00
03	BH-9E-1216	100	88	94	92	00
04	BH-E-1216	96	88	105	100	00
05	METHOD BLK. HEV4K1AA	100	90	103	92	00
06	LCS HEV4K1AC	100	97	111	102	00
07	BH-E-1216 D	92	85	100	96	00
08	BH-E-1216 S	93	89	105	96	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(73-118)
SRG02	= 1,2-Dichloroethane-d4	(62-128)
SRG03	= Toluene-d8	(77-117)
SRG04	= 4-Bromofluorobenzene	(78-118)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5G060000-161C
Matrix:	SOLID	**Lab WorkOrder:**	HEX3M1AC
% Moisture:	0.0	**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	07/05/05 10:31
QC Batch ID:	5187161	**Date/Time Analyzed:**	07/05/05 14:54
Sample Aliquot:	5 g	**Instrument ID:**	E
Dilution Factor:	1		

Analyte	True	Found	%Rec	Q	Limits
Benzene	2000	2100	105		78 - 130
Toluene	2000	1870	93		76 - 126
Trichloroethene	2000	2090	105		80 - 127
Chlorobenzene	2000	1930	97		79 - 120
1,1-Dichloroethene	2000	1980	99		54 - 124

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	112	61	129	
2037-26-5	Toluene-d8	106	68	128	
1868-53-7	Dibromofluoromethane	119	71	126	
460-00-4	4-Bromofluorobenzene	117	80	128	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5G060000-161L
Matrix:	SOLID	**Lab WorkOrder:**	HEX3M1AD
% Moisture:	0.0	**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	07/05/05 10:31
QC Batch ID:	5187161	**Date/Time Analyzed:**	07/05/05 15:20
Sample Aliquot:	5 g	**Instrument ID:**	E
Dilution Factor:	1		

Analyte	True	Found	C	% Rec	Q	RPD	Q	QC Limits	
								% Rec	RPD
Benzene	2000	2270		113		7.9		78 - 130	20
Toluene	2000	2080		104		11		76 - 126	20
Trichloroethene	2000	2260		113		7.8		80 - 127	20
Chlorobenzene	2000	2140		107		10		79 - 120	20
1,1-Dichloroethene	2000	2070		103		4.5		54 - 124	22

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	101	61	129	
2037-26-5	Toluene-d8	104	68	128	
1868-53-7	Dibromofluoromethane	109	71	126	
460-00-4	4-Bromofluorobenzene	111	80	128	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5G060000-161B
Matrix:	SOLID	**Lab WorkOrder:**	HEX3M1AA
% Moisture:		**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	07/05/05 10:31
QC Batch ID:	5187161	**Date/Time Analyzed:**	07/05/05 17:06
Sample Aliquot:	5 g	**Instrument ID:**	E
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	27	27	250	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	90	32	133	
2037-26-5	Toluene-d8	85	25	145	
1868-53-7	Dibromofluoromethane	98	43	131	
460-00-4	4-Bromofluorobenzene	92	29	148	

U Result is less than the method detection limit (MDL).

BLANK WORKORDER NO.

HEX3M1AA

SW846 8260B METHOD BLANK SUMMARY

Lab Name: Severn Trent Laboratories, Inc.

Lab Code: STLDEN SDG Number:

Lab File ID: E8453.D Lot Number: D5F250124

Date Analyzed: 07/05/05 Time Analyzed: 17:06

Matrix: SOLID Date Extracted:07/05/05

GC Column: DB624 ID: .53 Extraction Method: 5035

Instrument ID: E Level:(low/med) MED

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS, LCSD, MS , MSD:

	CLIENT ID.	SAMPLE WORK ORDER #	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	BH-D-1112	HED641AC	E8457.D	07/05/05	18:47
02	BH-C-1112	HED671AC	E8458.D	07/05/05	19:12
03	CHECK SAMPLE	HEX3M1AC C	E8448.D	07/05/05	14:54
04	DUPLICATE CHECK	HEX3M1AD L	E8449.D	07/05/05	15:20
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
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16					
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29					
30					

COMMENTS:

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5187161 SAS No.: 8260B SDG No.: D5F250124

Lab File ID: E8222 BFB Injection Date: 06/23/05

Instrument ID: E BFB Injection Time: 0844

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	19.2
75	30.0 - 60.0% of mass 95	47.1
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.5
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	63.2
175	5.0 - 9.0% of mass 174	5.1 (8.0)1
176	95.0 - 101.0% of mass 174	60.2 (95.2)1
177	5.0 - 9.0% of mass 176	4.2 (7.0)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SUPP001	SUPP001	E8223	06/23/05	0900
02	SUPP002	SUPP002	E8224	06/23/05	0925
03	SUPP005	SUPP005	E8225	06/23/05	0950
04	SUPP010	SUPP010	E8226	06/23/05	1016
05	SUPP030	SUPP030	E8227	06/23/05	1041
06	SUPP060	SUPP060	E8228	06/23/05	1107
07	MAIN001	MAIN001	E8229	06/23/05	1134
08	MAIN002	MAIN002	E8230	06/23/05	1200
09	MAIN005	MAIN005	E8231	06/23/05	1225
10	MAIN010	MAIN010	E8232	06/23/05	1251
11	MAIN030	MAIN030	E8233	06/23/05	1317
12	MAIN060	MAIN060	E8234	06/23/05	1342
13	ICV030	ICV030	E8236A	06/23/05	1509
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5187161 SAS No.: 8260B SDG No.: D5F250124

Lab File ID: E8437T BFB Injection Date: 07/05/05

Instrument ID: E BFB Injection Time: 1031

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	15.8
75	30.0 - 60.0% of mass 95	43.3
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	8.1
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	79.3
175	5.0 - 9.0% of mass 174	6.4 (8.1)1
176	95.0 - 101.0% of mass 174	78.4 (98.8)1
177	5.0 - 9.0% of mass 176	6.1 (7.8)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	MAIN010	MAIN010	E8438	07/05/05	1042
02	SUPP010	SUPP010	E8439	07/05/05	1107
03	LCS	LCS	E8448	07/05/05	1454
04	LCSD	LCSD	E8449	07/05/05	1520
05	PBLK	PBLK	E8453	07/05/05	1706
06	BH-D-1112	HED641AC	E8457	07/05/05	1847
07	BH-C-1112	HED671AC	E8458	07/05/05	1912
08					
09					
10					
11					
12					
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16					
17					
18					
19					
20					
21					
22					

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

Calibration File Names:
Level 1: /chem/E.i/062305.b/e8223.d
Level 2: /chem/E.i/062305.b/e8224.d
Level 3: /chem/E.i/062305.b/e8225.d
Level 4: /chem/E.i/062305.b/e8226.d
Level 5: /chem/E.i/062305.b/e8227.d
Level 6: /chem/E.i/062305.b/e8228.d

	Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
M	1 1,2-Dichloroethene (total)	0.32624	0.27751	0.28110	0.28884	0.27013	0.25922	AVRG		0.28384		8.13265
M	2 Xylene (total)	7.49782	6.65933	6.73320	6.62077	6.64157	6.48453	AVRG		6.77287		5.37865
	3 dichlorodifluoromethane	+++++	0.42277	0.45344	0.44958	0.45851	0.43654	AVRG		0.44417		3.25675
	4 Dichlorotetraflouroethane	0.53884	0.52649	0.50083	0.53490	0.54863	0.52764	AVRG		0.52955		3.06406
	5 Chloromethane	+++++	0.18722	0.18370	0.18064	0.18360	0.17215	AVRG		0.18146		3.14281
	6 Vinyl Chloride	0.23117	0.19982	0.20954	0.21175	0.21455	0.20624	AVRG		0.21218		4.99492
	7 Bromomethane	+++++	0.21433	0.20571	0.19786	0.20183	0.19170	AVRG		0.20228		4.20023
	8 Ethylene Oxide	0.00192	0.00183	0.00181	0.00196	0.00193	0.00192	AVRG		0.00189		3.10632
	9 Chloroethane	+++++	0.13402	0.13292	0.13248	0.12110	0.11249	AVRG		0.12660		7.48094

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	Coefficients m1	Coefficients m2	%RSD or R^2
10 Dichlorofluoromethane	0.51066	0.51298	0.48261	0.53446	0.52017	0.49581	AVRG		0.50945		3.57752
11 Trichlorofluoromethane	+++++	0.66746	0.71359	0.70367	0.71545	0.69277	AVRG		0.69859		2.80707
12 Ethanol	+++++	4380	9873	13564	37304	89723	LINR	0.27503	0.00035		0.99102
13 Ethyl Ether	0.09235	0.08344	0.07951	0.09207	0.08595	0.08009	AVRG		0.08557		6.60292
14 1,2-dichloro-1,1,2-trifluoroe	0.35513	0.36032	0.35390	0.37697	0.36969	0.34461	AVRG		0.36010		3.23750
15 2,2-dichoro-1,1,1-trifluoroet	0.58884	0.58767	0.54766	0.60047	0.59456	0.56047	AVRG		0.57994		3.61273
16 Acrolein	0.00970	0.00809	0.00775	0.00779	0.00662	0.00688	AVRG		0.00780		13.93056
17 1,1-Dichloroethene	0.31387	0.25646	0.24817	0.25536	0.23508	0.22896	AVRG		0.25632		11.80714
18 Trichlorotrifluoroethane	0.40255	0.39430	0.38121	0.39547	0.40832	0.37869	AVRG		0.39342		2.95601
19 Acetone	+++++	0.01271	0.01286	0.01251	0.01003	0.01025	AVRG		0.01167		12.04809
20 Iodomethane	0.60585	0.49734	0.49905	0.52290	0.49714	0.47847	AVRG		0.51679		8.87408
21 Carbon Disulfide	0.73502	0.65079	0.62353	0.68026	0.65880	0.61884	AVRG		0.66121		6.46632
22 2-Propanol	0.00249	0.00254	0.00238	0.00244	0.00230	0.00249	AVRG		0.00244		3.48461
23 Acetonitrile	3592	5778	17960	23056	80757	176652	WLINR	-0.16251	0.00342		0.99138
24 Allyl Chloride	0.27203	0.28418	0.25682	0.26581	0.27041	0.24670	AVRG		0.26599		4.88167
25 Methyl acetate	0.03519	0.03584	0.03260	0.03537	0.03447	0.03307	AVRG		0.03442		3.82260
26 Methylene Chloride	35370	46783	92185	172323	440189	887754	WLINR	-0.13586	0.17433		0.99379

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
27 tert-Butyl alcohol	+++++	0.00506	0.00522	0.00542	0.00462	0.00508	AVRG		0.00508		5.83270
28 Acrylonitrile	0.01431	0.01244	0.01298	0.01308	0.01196	0.01248	AVRG		0.01288		6.32311
29 trans-1,2-Dichloroethene	0.32953	0.27977	0.29207	0.29481	0.27719	0.26436	AVRG		0.28962		7.74405
30 Methyl t-butyl ether	0.31215	0.30876	0.29488	0.33036	0.32821	0.31943	AVRG		0.31563		4.20174
31 Hexane	1.81174	1.77401	1.63013	1.74841	1.80227	1.79313	AVRG		1.75995		3.83331
32 1,1-Dichloroethane	0.55258	0.46335	0.44982	0.45840	0.43260	0.41657	AVRG		0.46222		10.28301
33 Vinyl acetate	0.18725	0.17671	0.17126	0.18970	0.18856	0.18783	AVRG		0.18355		4.16825
34 Isopropyl ether	0.23201	0.20255	0.20608	0.20846	0.19622	0.19291	AVRG		0.20637		6.71783
35 Chloroprene	0.43210	0.37798	0.36196	0.35875	0.35921	0.34540	AVRG		0.37257		8.31085
36 ETBE	0.53947	0.54953	0.52751	0.58952	0.59367	0.58955	AVRG		0.56488		5.20533
37 2,2-Dichloropropane	0.66719	0.52517	0.51815	0.52587	0.48702	0.47309	AVRG		0.53275		13.01676
38 cis-1,2-Dichloroethene	0.32295	0.27524	0.27014	0.28287	0.26307	0.25408	AVRG		0.27806		8.67390
39 2-Butanone	11153	19707	36490	76668	194065	417531	WLINR	-0.25322	0.02065		0.99440
40 Propionitrile	0.00502	0.00429	0.00487	0.00495	0.00465	0.00483	AVRG		0.00477		5.63003
41 Ethyl Acetate	+++++	0.06840	0.05071	0.05923	0.06054	0.05909	AVRG		0.05959		10.53611
42 Methacrylonitrile	0.04182	0.03336	0.03522	0.03562	0.03158	0.03301	AVRG		0.03510		10.28536
43 Bromochloromethane	0.13348	0.11222	0.11246	0.11677	0.10224	0.10507	AVRG		0.11371		9.71852

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	Coefficients m1	Coefficients m2	%RSD or R^2
44 Chloroform	0.61052	0.53413	0.50470	0.51577	0.49265	0.48810	AVRG		0.52431		8.65604
45 Tetrahydrofuran	+++++	0.01302	0.01352	0.01496	0.01279	0.01334	AVRG		0.01352		6.27986
47 1,1,1-Trichloroethane	0.74936	0.62325	0.61279	0.61844	0.59467	0.57074	AVRG		0.62821		9.93113
48 Cyclohexane	0.41222	0.41834	0.40831	0.41759	0.43071	0.42249	AVRG		0.41828		1.87962
49 1,1-Dichloropropene	0.54876	0.44932	0.44888	0.44902	0.44203	0.42127	AVRG		0.45988		9.75350
50 Carbon Tetrachloride	0.69635	0.57984	0.56656	0.57774	0.55917	0.55793	AVRG		0.58960		9.00395
51 Isobutanol	+++++	0.00150	0.00161	0.00156	0.00142	0.00145	AVRG		0.00151		5.07118
53 Benzene	0.91689	0.77949	0.77662	0.77325	0.76519	0.74020	AVRG		0.79194		7.93496
54 1,2-Dichloroethane	0.23494	0.18210	0.20072	0.20885	0.18303	0.18707	AVRG		0.19945		10.21027
55 TAME	0.38082	0.38155	0.37062	0.40948	0.41441	0.41974	AVRG		0.39610		5.25645
57 n-Butanol	+++++	0.00175	0.00158	0.00168	0.00145	0.00167	AVRG		0.00163		6.93237
58 Trichloroethene	0.39808	0.34808	0.33850	0.34641	0.34449	0.33054	AVRG		0.35102		6.81701
59 Methyl cyclohexane	0.50523	0.49492	0.45772	0.48950	0.51624	0.51259	AVRG		0.49603		4.30336
60 2-Pentanone	0.04221	0.03600	0.03541	0.04016	0.04068	0.04170	AVRG		0.03936		7.44351
61 1,2-Dichloropropane	0.26144	0.23254	0.23465	0.23247	0.22206	0.21407	AVRG		0.23287		6.89796
62 Dibromomethane	0.16024	0.13809	0.14572	0.14533	0.13064	0.13328	AVRG		0.14222		7.55663
63 Methyl Methacrylate	0.08069	0.06305	0.06034	0.07330	0.07091	0.07376	AVRG		0.07034		10.65691

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
64 1,4-Dioxane	+++++	0.00073	0.00072	0.00076	0.00070	0.00074	AVRG		0.00073		2.94032
65 Bromodichloromethane	0.45693	0.39924	0.41205	0.42396	0.39972	0.39545	AVRG		0.41456		5.61561
66 2-nitropropane	+++++	0.09756	0.07509	0.08876	0.08070	0.08674	AVRG		0.08577		9.90218
67 2-Chloroethyl vinyl ether	2295	4451	11838	25353	90092	215999	LINR	0.19164	0.19869		0.99419
68 cis-1,3-Dichloropropene	1.78246	1.60429	1.56681	1.61241	1.51250	1.51238	AVRG		1.59848		6.24878
69 4-Methyl-2-pentanone	0.37535	0.38183	0.35539	0.35863	0.31832	0.33213	AVRG		0.35361		6.93186
71 Toluene	5.45231	4.60072	4.63232	4.59997	4.52152	4.45010	AVRG		4.70949		7.85467
72 trans-1,3-Dichloropropene	1.28805	1.14890	1.17371	1.18454	1.11374	1.15364	AVRG		1.17710		5.05981
73 Ethyl methacrylate	0.57755	0.60770	0.62169	0.67750	0.68681	0.71333	AVRG		0.64743		8.15034
74 1,1,2-Trichloroethane	0.78369	0.69149	0.70767	0.70612	0.67407	0.69489	AVRG		0.70965		5.38891
75 Tetrachloroethene	2.04124	1.69300	1.71055	1.74685	1.72162	1.65512	AVRG		1.76140		7.97512
76 1,3-Dichloropropane	1.21396	1.03609	1.08658	1.11077	1.01848	1.02556	AVRG		1.08191		6.86594
77 2-Hexanone	0.25900	0.22966	0.23127	0.23070	0.21417	0.22306	AVRG		0.23131		6.50422
78 Tetrahydrothiophene	0.16199	0.20897	0.20599	0.20437	0.23211	0.24413	AVRG		0.20959		13.50589
79 Dibromochloromethane	1.39747	1.27337	1.28729	1.31375	1.27728	1.28220	AVRG		1.30523		3.63076
80 1,2-Dibromoethane	0.96602	0.88355	0.92543	0.92378	0.87692	0.91290	AVRG		0.91477		3.53634
82 1-Chlorohexane	2.80303	2.44355	2.38685	2.34823	2.38814	2.27476	AVRG		2.44076		7.62188

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

	Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
83	Chlorobenzene	3.67069	3.12487	3.15694	3.18991	3.07519	3.04452	AVRG		3.21035		7.21512
84	1,1,1,2-Tetrachloroethane	1.53222	1.38403	1.42833	1.45256	1.39682	1.38074	AVRG		1.42912		4.03150
85	Ethylbenzene	2.01394	1.66190	1.69617	1.70854	1.67956	1.61249	AVRG		1.72877		8.31069
86	m and p-Xylene	2.59710	2.27826	2.35866	2.30544	2.31398	2.23300	AVRG		2.34774		5.49526
88	o-Xylene	2.30361	2.10281	2.01589	2.00989	2.01362	2.01852	AVRG		2.07739		5.60106
89	Styrene	3.56880	3.26536	3.19713	3.30896	3.23860	3.15001	AVRG		3.28814		4.50141
90	Bromoform	0.84717	0.78949	0.82468	0.82416	0.79920	0.83888	AVRG		0.82060		2.72220
91	isopropyl benzene	7.89725	6.77399	6.84709	6.77503	6.84141	6.64581	AVRG		6.96343		6.65173
92	cis-1,4-Dichloro-2-Butene	0.03292	0.02780	0.02936	0.03356	0.03434	0.03606	AVRG		0.03234		9.69699
93	Cyclohexanone	0.01455	0.01117	0.01231	0.01202	0.01105	0.01078	AVRG		0.01198		11.60365
95	1,1,2,2-Tetrachloroethane	0.80953	0.75180	0.77058	0.76147	0.72045	0.74519	AVRG		0.75984		3.91233
96	Bromobenzene	0.98331	0.84496	0.89739	0.88158	0.85928	0.85857	AVRG		0.88752		5.69067
97	1,2,3-Trichloropropane	0.12152	0.12069	0.12226	0.12762	0.12033	0.12369	AVRG		0.12269		2.20017
98	t-1,4-Dichloro-2-butene	3968	4499	11224	24458	76470	160617	WLINR	-0.00344	0.08275		0.99610
99	n-Propylbenzene	1.05873	0.90906	0.88603	0.88546	0.89498	0.85221	AVRG		0.91441		7.99839
100	2-Chlorotoluene	0.84824	0.69551	0.64414	0.71706	0.70629	0.67168	AVRG		0.71382		9.92628
101	1,3,5-Trimethylbenzene	3.51207	3.13308	2.97262	2.94859	2.97061	2.86967	AVRG		3.06777		7.62527

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STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

	Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	Coefficients m1	Coefficients m2	%RSD or R^2
102	4-Chlorotoluene	0.90186	0.76070	0.74925	0.75781	0.73822	0.72124	AVRG		0.77151		8.48494
103	tert-Butylbenzene	3.70849	3.09594	3.10588	3.08519	3.11779	2.97817	AVRG		3.18191		8.26053
104	1,2,4-Trimethylbenzene	3.04163	2.60743	2.63008	2.59315	2.62218	2.50699	AVRG		2.66691		7.08139
105	sec-Butylbenzene	0.87257	0.74955	0.74341	0.73729	0.75064	0.71475	AVRG		0.76137		7.35918
106	m-Dichlorobenzene	1.67673	1.38112	1.40655	1.41471	1.37415	1.37466	AVRG		1.43798		8.21926
107	4-Isopropyltoluene	4.14941	3.47433	3.39719	3.44437	3.48249	3.31226	AVRG		3.54334		8.56328
109	p-dichlorobenzene	1.78652	1.61327	1.69041	1.56018	1.56006	1.47463	AVRG		1.61418		6.83322
110	1,2,3-Trimethylbenzene	0.82528	0.83681	0.79244	0.88773	0.90554	0.89001	AVRG		0.85630		5.21458
111	n-Butylbenzene	4.01820	3.26723	3.19869	3.14659	3.21534	3.15235	AVRG		3.33307		10.15737
112	o-Dichlorobenzene	1.38626	1.14913	1.17334	1.18563	1.11343	1.09974	AVRG		1.18459		8.79861
113	1,2-Dibromo-3-chloropropane	+++++	0.09088	0.09501	0.09833	0.09311	0.09658	AVRG		0.09478		3.07002
114	1,2,4-Trichlorobenzene	1.09407	0.90761	0.92260	0.89354	0.87006	0.88077	AVRG		0.92811		8.98894
115	Hexachlorobutadiene	1.18870	1.02477	1.00093	0.98070	0.97724	0.91703	AVRG		1.01490		9.10194
116	Napthalene	0.68765	0.61090	0.67092	0.61156	0.53959	0.55541	AVRG		0.61267		9.69449
117	1,2,3-Trichlorobenzene	0.77078	0.68422	0.67349	0.68706	0.64293	0.64842	AVRG		0.68449		6.72743
$ 46	Dibromofluoromethane	0.42206	0.41184	0.41922	0.43915	0.43584	0.42482	AVRG		0.42549		2.42286

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STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/E.i/070505.b/E-20ml8260B.m
Cal Date : 06-Jul-2005 08:53 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
$ 52 1,2-Dichloroethane-d4	0.17570	0.17622	0.17016	0.18617	0.18368	0.18113	AVRG		0.17884		3.30189
$ 70 Toluene-d8	4.03951	4.28865	4.25219	4.47186	4.35851	4.36860	AVRG		4.29655		3.41845
$ 94 Bromofluorobenzene	2.18035	2.24236	2.23028	2.28543	2.29685	2.27605	AVRG		2.25189		1.92612

Curve	Formula	Units
Averaged	Amt = Rsp/m1	Response
Linear	Amt = b + Rsp/m1	Response
Wt Linear	Amt = b + Rsp/m1	Response

Report Date: 06-Jul-2005 13:28

Calibration History

Method : /chem/E.i/070505.b/E-20ml8260B.m
Start Cal Date: 19-APR-2005 16:47
End Cal Date : 23-JUN-2005 13:42

Initial Calibration

Injection Date	Sublist	Calibration File
Cal Level: 1 , Cal Amount: 1.00000		
23-JUN-2005 09:00	2-supp	/chem/E.i/062305.b/e8223.d
23-JUN-2005 11:34	1-main	/chem/E.i/062305.b/e8229.d
Cal Level: 2 , Cal Amount: 2.00000		
23-JUN-2005 09:25	2-supp	/chem/E.i/062305.b/e8224.d
23-JUN-2005 12:00	1-main	/chem/E.i/062305.b/e8230.d
Cal Level: 3 , Cal Amount: 5.00000		
23-JUN-2005 09:50	2-supp	/chem/E.i/062305.b/e8225.d
23-JUN-2005 12:25	1-main	/chem/E.i/062305.b/e8231.d
Cal Level: 4 , Cal Amount: 10.0000		
23-JUN-2005 10:16	2-supp	/chem/E.i/062305.b/e8226.d
23-JUN-2005 12:51	1-main	/chem/E.i/062305.b/e8232.d
Cal Level: 5 , Cal Amount: 30.0000		
23-JUN-2005 10:41	2-supp	/chem/E.i/062305.b/e8227.d
23-JUN-2005 13:17	1-main	/chem/E.i/062305.b/e8233.d
Cal Level: 6 , Cal Amount: 60.0000		
23-JUN-2005 11:07	2-supp	/chem/E.i/062305.b/e8228.d
23-JUN-2005 13:42	1-main	/chem/E.i/062305.b/e8234.d

Continuing Calibration

05-JUL-2005 11:07	2-supp	/chem/E.i/070505.b/e8439.d
05-JUL-2005 10:42	1-main	/chem/E.i/070505.b/e8438.d

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: E.i
Lab File ID: e8438.d
Analysis Type: WATER

Injection Date: 05-JUL-2005 10:42
Lab Sample ID: MAIN010
Method File: /chem/E.i/070505.b/E-20ml8260B.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
85	1,2-Dichloroethene (total)	20.0000	17.8582	10.7	50.0
83	Xylene (total)	30.0000	25.6458	14.5	50.0
64	dichlorodifluoromethane	10.0000	9.1523	8.5	50.0
1	Chloromethane	10.0000	9.4537	5.5	50.0
4	Vinyl Chloride	10.0000	8.6835	13.2	20.0
2	Bromomethane	10.0000	8.1688	18.3	50.0
5	Chloroethane	10.0000	9.7511	2.5	50.0
11	Trichlorofluoromethane	10.0000	8.8563	11.4	50.0
3	Ethanol	500.0000	416.8996	16.6	50.0
8	Acrolein	100.0000	79.2979	20.7	50.0
12	1,1-Dichloroethene	10.0000	8.8691	11.3	20.0
7	Acetone	40.0000	35.2536	11.9	50.0
21	Iodomethane	10.0000	8.5490	14.5	50.0
68	Acetonitrile	100.0000	62.6127	37.4	50.0
6	Methylene Chloride	10.0000	8.3817	16.2	50.0
86	tert-Butyl alcohol	200.0000	155.8089	22.1	50.0
0	trans-1,2-Dichloroethene	10.0000	8.8524	11.5	50.0
9	Acrylonitrile	100.0000	90.4108	9.6	50.0
84	Isopropyl ether	50.0000	41.5314	16.9	50.0
15	1,1-Dichloroethane	10.0000	8.4744	15.3	50.0
69	Chloroprene	10.0000	7.9121	20.9	50.0
93	2,2-Dichloropropane	10.0000	7.8879	21.1	50.0
0	cis-1,2-Dichloroethene	10.0000	9.0058	9.9	50.0
20	2-Butanone	40.0000	33.6964	15.8	50.0
70	Propionitrile	100.0000	86.4298	13.6	50.0
13	Bromochloromethane	10.0000	8.6127	13.9	50.0
72	Methacrylonitrile	100.0000	82.7456	17.3	50.0
17	Chloroform	10.0000	8.4360	15.6	20.0
22	1,1,1-Trichloroethane	10.0000	8.0813	19.2	50.0
23	Carbon Tetrachloride	10.0000	7.9354	20.6	50.0
94	1,1-Dichloropropene	10.0000	8.3037	17.0	50.0
71	Isobutanol	200.0000	157.3763	21.3	50.0
30	Benzene	10.0000	8.3243	16.8	50.0
16	1,2-Dichloroethane	10.0000	8.0832	19.2	50.0
88	n-Butanol	200.0000	154.2634	22.9	50.0
29	Trichloroethene	10.0000	8.6637	13.4	50.0
26	1,2-Dichloropropane	10.0000	8.6225	13.8	20.0
34	Dibromomethane	10.0000	8.4326	15.7	50.0
57	1,4-Dioxane	500.0000	432.2065	13.6	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: E.i Injection Date: 05-JUL-2005 10:42
Lab File ID: e8438.d Lab Sample ID: MAIN010
Analysis Type: WATER Method File: /chem/E.i/070505.b/E-20ml8260B.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
25	Bromodichloromethane	10.0000	8.3859	16.1	50.0
28	cis-1,3-Dichloropropene	10.0000	8.3708	16.3	50.0
38	4-Methyl-2-pentanone	40.0000	31.8713	20.3	50.0
45	Toluene	10.0000	8.6926	13.1	20.0
31	trans-1,3-Dichloropropene	10.0000	8.1979	18.0	50.0
32	1,1,2-Trichloroethane	10.0000	8.5250	14.7	50.0
42	Tetrachloroethene	10.0000	8.8082	11.9	50.0
109	1,3-Dichloropropane	10.0000	8.5108	14.9	50.0
43	2-Hexanone	40.0000	29.2740	26.8	50.0
36	Dibromochloromethane	10.0000	8.5053	14.9	50.0
58	1,2-Dibromoethane	10.0000	8.3238	16.8	50.0
92	1-Chlorohexane	10.0000	8.6793	13.2	50.0
46	Chlorobenzene	10.0000	8.7028	13.0	50.0
74	1,1,1,2-Tetrachloroethane	10.0000	8.5178	14.8	50.0
47	Ethylbenzene	10.0000	8.7425	12.6	20.0
0	m and p-Xylene	20.0000	17.2676	13.7	50.0
0	o-Xylene	10.0000	8.3782	16.2	50.0
49	Styrene	10.0000	8.6795	13.2	50.0
37	Bromoform	10.0000	8.5854	14.1	50.0
79	isopropyl benzene	10.0000	8.3982	16.0	50.0
76	Cyclohexanone	400.0000	297.5696	25.6	50.0
95	Bromobenzene	10.0000	8.2949	17.1	50.0
40	1,1,2,2-Tetrachloroethane	10.0000	8.1336	18.7	50.0
50	1,2,3-Trichloropropane	10.0000	8.5962	14.0	50.0
96	n-Propylbenzene	10.0000	8.3107	16.9	50.0
97	2-Chlorotoluene	10.0000	8.6008	14.0	50.0
98	1,3,5-Trimethylbenzene	10.0000	7.9338	20.7	50.0
99	4-Chlorotoluene	10.0000	8.1772	18.2	50.0
100	tert-Butylbenzene	10.0000	8.2229	17.8	50.0
101	1,2,4-Trimethylbenzene	10.0000	8.1729	18.3	50.0
102	sec-Butylbenzene	10.0000	8.3524	16.5	50.0
103	4-Isopropyltoluene	10.0000	8.1740	18.3	50.0
61	m-Dichlorobenzene	10.0000	8.3963	16.0	50.0
62	p-dichlorobenzene	10.0000	8.4212	15.8	50.0
104	n-Butylbenzene	10.0000	8.0150	19.8	50.0
63	o-Dichlorobenzene	10.0000	8.1191	18.8	50.0
75	1,2-Dibromo-3-chloropropane	10.0000	8.3204	16.8	50.0
105	1,2,4-Trichlorobenzene	10.0000	8.5518	14.5	50.0
106	Hexachlorobutadiene	10.0000	7.7955	22.0	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: E.i Injection Date: 05-JUL-2005 10:42
Lab File ID: e8438.d Lab Sample ID: MAIN010
Analysis Type: WATER Method File: /chem/E.i/070505.b/E-20ml8260B.m

COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
107 Napthalene	10.0000	8.9796	10.2	50.0
108 1,2,3-Trichlorobenzene	10.0000	8.5808	14.2	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: E.i
Lab File ID: e8438.d
Analysis Type: WATER
Lab Sample ID: MAIN010
Quant Type: ISTD

Injection Date: 05-JUL-2005 10:42
Init. Calibration Date(s): 04/19/5 06/23/5
Init. Calibration Times: 16:47 13:42
Method File: /chem/E.i/070505.b/E-20ml8260B.m

	COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D
M	1 1,2-Dichloroethene (total)	0.284	0.253	0.010	10.7	50.0
M	2 Xylene (total)	6.773	5.794	0.010	14.4	50.0
	3 dichlorodifluoromethane	0.444	0.407	0.010	8.5	50.0
	5 Chloromethane	0.181	0.172	0.100	5.5	50.0
	6 Vinyl Chloride	0.212	0.184	0.020	13.2	20.0
	7 Bromomethane	0.202	0.165	0.010	18.3	50.0
	9 Chloroethane	0.127	0.123	0.010	2.5	50.0
	11 Trichlorofluoromethane	0.699	0.619	0.010	11.4	50.0
	12 Ethanol	0.000	0.000	0.000	N/A	N/A
	16 Acrolein	0.008	0.006	0.001	20.7	50.0
	17 1,1-Dichloroethene	0.256	0.227	0.020	11.3	20.0
	19 Acetone	0.012	0.010	0.001	11.9	50.0
	20 Iodomethane	0.517	0.442	0.010	14.5	50.0
	23 Acetonitrile	0.003	0.002	0.000	N/A	N/A
	26 Methylene Chloride	0.174	0.170	0.010	N/A	N/A
	27 tert-Butyl alcohol	0.005	0.004	0.001	22.1	50.0
	28 Acrylonitrile	0.013	0.012	0.001	9.6	50.0
	29 trans-1,2-Dichloroethene	0.290	0.256	0.010	11.5	50.0
	32 1,1-Dichloroethane	0.462	0.392	0.100	15.3	50.0
	34 Isopropyl ether	0.206	0.171	0.010	16.9	50.0
	35 Chloroprene	0.373	0.295	0.010	20.9	50.0
	37 2,2-Dichloropropane	0.533	0.420	0.010	21.1	50.0
	38 cis-1,2-Dichloroethene	0.278	0.250	0.010	9.9	50.0
	39 2-Butanone	0.021	0.019	0.010	N/A	N/A
	40 Propionitrile	0.005	0.004	0.001	13.6	50.0
	42 Methacrylonitrile	0.035	0.029	0.010	17.3	50.0
	43 Bromochloromethane	0.114	0.098	0.010	13.9	50.0
	44 Chloroform	0.524	0.442	0.020	15.6	20.0
	47 1,1,1-Trichloroethane	0.628	0.508	0.010	19.2	50.0
	49 1,1-Dichloropropene	0.460	0.382	0.010	17.0	50.0
	50 Carbon Tetrachloride	0.590	0.468	0.010	20.6	50.0
	51 Isobutanol	0.002	0.001	0.000	21.3	50.0
	53 Benzene	0.792	0.659	0.010	16.8	50.0
	54 1,2-Dichloroethane	0.199	0.161	0.010	19.2	50.0
	57 n-Butanol	0.002	0.001	0.000	22.9	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: E.i
Lab File ID: e8438.d
Analysis Type: WATER
Lab Sample ID: MAIN010
Quant Type: ISTD

Injection Date: 05-JUL-2005 10:42
Init. Calibration Date(s): 04/19/5 06/23/5
Init. Calibration Times: 16:47 13:42
Method File: /chem/E.i/070505.b/E-20ml8260B.m

	COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D
58	Trichloroethene	0.351	0.304	0.010	13.4	50.0
61	1,2-Dichloropropane	0.233	0.201	0.020	13.8	20.0
62	Dibromomethane	0.142	0.120	0.010	15.7	50.0
64	1,4-Dioxane	0.001	0.001	0.000	13.6	50.0
65	Bromodichloromethane	0.415	0.348	0.010	16.1	50.0
68	cis-1,3-Dichloropropene	1.598	1.338	0.010	16.3	50.0
69	4-Methyl-2-pentanone	0.354	0.282	0.010	20.3	50.0
71	Toluene	4.709	4.094	0.020	13.1	20.0
72	trans-1,3-Dichloropropene	1.177	0.965	0.010	18.0	50.0
74	1,1,2-Trichloroethane	0.710	0.605	0.010	14.7	50.0
75	Tetrachloroethene	1.761	1.551	0.010	11.9	50.0
76	1,3-Dichloropropane	1.082	0.921	0.010	14.9	50.0
77	2-Hexanone	0.231	0.169	0.010	26.8	50.0
79	Dibromochloromethane	1.305	1.110	0.010	14.9	50.0
80	1,2-Dibromoethane	0.915	0.761	0.010	16.8	50.0
82	1-Chlorohexane	2.441	2.118	0.010	13.2	50.0
83	Chlorobenzene	3.210	2.794	0.300	13.0	50.0
84	1,1,1,2-Tetrachloroethane	1.429	1.217	0.010	14.8	50.0
85	Ethylbenzene	1.729	1.511	0.010	12.6	20.0
86	m and p-Xylene	2.348	2.027	0.010	13.7	50.0
88	o-Xylene	2.077	1.740	0.010	16.2	50.0
89	Styrene	3.288	2.854	0.010	13.2	50.0
90	Bromoform	0.821	0.705	0.101	14.1	50.0
91	isopropyl benzene	6.963	5.848	0.010	16.0	50.0
93	Cyclohexanone	0.012	0.009	0.001	25.6	50.0
95	1,1,2,2-Tetrachloroethane	0.760	0.618	0.300	18.7	50.0
96	Bromobenzene	0.888	0.736	0.010	17.1	50.0
97	1,2,3-Trichloropropane	0.123	0.105	0.010	14.0	50.0
99	n-Propylbenzene	0.914	0.760	0.010	16.9	50.0
100	2-Chlorotoluene	0.714	0.614	0.010	14.0	50.0
101	1,3,5-Trimethylbenzene	3.068	2.434	0.010	20.7	50.0
102	4-Chlorotoluene	0.772	0.631	0.010	18.2	50.0
103	tert-Butylbenzene	3.182	2.616	0.010	17.8	50.0
104	1,2,4-Trimethylbenzene	2.667	2.180	0.010	18.3	50.0
105	sec-Butylbenzene	0.761	0.636	0.010	16.5	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: E.i
Lab File ID: e8438.d
Analysis Type: WATER
Lab Sample ID: MAIN010
Quant Type: ISTD

Injection Date: 05-JUL-2005 10:42
Init. Calibration Date(s): 04/19/5 06/23/5
Init. Calibration Times: 16:47 13:42
Method File: /chem/E.i/070505.b/E-20ml8260B.m

COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D
106 m-Dichlorobenzene	1.438	1.207	0.010	16.0	50.0
107 4-Isopropyltoluene	3.543	2.896	0.010	18.3	50.0
109 p-dichlorobenzene	1.614	1.359	0.010	15.8	50.0
111 n-Butylbenzene	3.333	2.671	0.010	19.8	50.0
112 o-Dichlorobenzene	1.185	0.962	0.010	18.8	50.0
113 1,2-Dibromo-3-chloropropane	0.095	0.079	0.010	16.8	50.0
114 1,2,4-Trichlorobenzene	0.928	0.794	0.010	14.5	50.0
115 Hexachlorobutadiene	1.015	0.791	0.010	22.0	50.0
116 Napthalene	0.613	0.550	0.010	10.2	50.0
117 1,2,3-Trichlorobenzene	0.684	0.587	0.010	14.2	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: E.i
Lab File ID: e8439.d
Analysis Type: WATER

Injection Date: 05-JUL-2005 11:07
Lab Sample ID: SUPP010
Method File: /chem/E.i/070505.b/E-20ml8260B.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
121	Dichlorotetraflouroethane	10.0000	7.8493	21.5	50.0
110	Ethylene Oxide	1250.0000	1150.7156	7.9	50.0
87	Dichlorofluoromethane	10.0000	9.8271	1.7	50.0
77	Ethyl Ether	10.0000	9.3296	6.7	50.0
117	1,2-dichloro-1,1,2-trifluoroe	10.0000	10.0027	0.0	50.0
116	2,2-dichoro-1,1,1-trifluoroet	10.0000	9.9064	0.9	50.0
65	Trichlorotrifluoroethane	10.0000	10.1029	1.0	50.0
118	2-Propanol	200.0000	189.0338	5.5	50.0
10	Carbon Disulfide	10.0000	9.4687	5.3	50.0
67	Allyl Chloride	10.0000	9.9147	0.9	50.0
122	Methyl acetate	50.0000	46.9107	6.2	50.0
53	Methyl t-butyl ether	10.0000	9.2830	7.2	50.0
54	Hexane	10.0000	9.9644	0.4	50.0
24	Vinyl acetate	20.0000	19.0673	4.7	50.0
123	ETBE	50.0000	46.8604	6.3	50.0
78	Ethyl Acetate	20.0000	17.3600	13.2	50.0
56	Tetrahydrofuran	20.0000	20.2265	1.1	50.0
114	Cyclohexane	10.0000	10.5952	6.0	50.0
89	Dibromofluoromethane	10.0000	7.4404	25.6	50.0
303	1,2-Dichloroethane-d4	10.0000	8.8704	11.3	50.0
124	TAME	50.0000	46.5271	6.9	50.0
125	Methyl cyclohexane	10.0000	10.0032	0.0	50.0
119	2-Pentanone	40.0000	36.4480	8.9	50.0
73	Methyl Methacrylate	20.0000	17.9964	10.0	50.0
82	2-nitropropane	10.0000	7.7880	22.1	50.0
35	2-Chloroethyl vinyl ether	10.0000	8.3725	16.3	50.0
301	Toluene-d8	10.0000	9.2320	7.7	50.0
41	Ethyl methacrylate	20.0000	18.9987	5.0	50.0
127	Tetrahydrothiophene	10.0000	7.6899	23.1	50.0
120	cis-1,4-Dichloro-2-Butene	10.0000	9.5210	4.8	50.0
302	Bromofluorobenzene	10.0000	9.6642	3.4	50.0
60	t-1,4-Dichloro-2-butene	10.0000	8.5037	15.0	50.0
126	1,2,3-Trimethylbenzene	10.0000	10.0894	0.9	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: E.i
Lab File ID: e8439.d
Analysis Type: WATER
Lab Sample ID: SUPP010
Quant Type: ISTD

Injection Date: 05-JUL-2005 11:07
Init. Calibration Date(s): 04/19/5 06/23/5
Init. Calibration Times: 16:47 13:42
Method File: /chem/E.i/070505.b/E-20ml8260B.m

COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D
$ 46 Dibromofluoromethane	0.425	0.317	0.010	25.6	50.0
$ 52 1,2-Dichloroethane-d4	0.179	0.159	0.010	11.3	50.0
$ 70 Toluene-d8	4.297	3.967	0.010	7.7	50.0
$ 94 Bromofluorobenzene	2.252	2.176	0.010	3.4	50.0
4 Dichlorotetraflouroethane	0.530	0.416	0.010	21.5	50.0
8 Ethylene Oxide	0.002	0.002	0.001	7.9	50.0
10 Dichlorofluoromethane	0.509	0.501	0.010	1.7	50.0
13 Ethyl Ether	0.086	0.080	0.010	6.7	50.0
14 1,2-dichloro-1,1,2-trifluor	0.360	0.360	0.010	0.0	50.0
15 2,2-dichoro-1,1,1-trifluoro	0.580	0.575	0.010	0.9	50.0
18 Trichlorotrifluoroethane	0.393	0.397	0.010	-1.0	50.0
21 Carbon Disulfide	0.661	0.626	0.010	5.3	50.0
22 2-Propanol	0.002	0.002	0.001	5.5	50.0
24 Allyl Chloride	0.266	0.264	0.010	0.9	50.0
25 Methyl acetate	0.034	0.032	0.001	6.2	50.0
30 Methyl t-butyl ether	0.316	0.293	0.010	7.2	50.0
31 Hexane	1.760	1.754	0.010	0.4	50.0
33 Vinyl acetate	0.184	0.175	0.010	4.7	50.0
36 ETBE	0.565	0.529	0.010	6.3	50.0
41 Ethyl Acetate	0.060	0.052	0.010	13.2	50.0
45 Tetrahydrofuran	0.014	0.014	0.003	-1.1	50.0
48 Cyclohexane	0.418	0.443	0.010	-6.0	50.0
55 TAME	0.396	0.369	0.010	6.9	50.0
59 Methyl cyclohexane	0.496	0.496	0.010	0.0	50.0
60 2-Pentanone	0.039	0.036	0.010	8.9	50.0
63 Methyl Methacrylate	0.070	0.063	0.010	10.0	50.0
66 2-nitropropane	0.086	0.067	0.010	22.1	50.0
67 2-Chloroethyl vinyl ether	0.199	0.128	0.010	N/A	N/A
73 Ethyl methacrylate	0.647	0.615	0.010	5.0	50.0
78 Tetrahydrothiophene	0.210	0.161	0.010	23.1	50.0
92 cis-1,4-Dichloro-2-Butene	0.032	0.031	0.010	4.8	50.0
98 t-1,4-Dichloro-2-butene	0.083	0.071	0.010	N/A	N/A
110 1,2,3-Trimethylbenzene	0.856	0.864	0.010	-0.9	50.0

INITIAL CALIBRATION VERIFICATION

Instrument ID: E.i Injection Date: 23-JUN-2005 15:09
Lab File ID: e8236a.d Lab Sample ID: ICV030
Analysis Type: WATER Method File: /chem/E.i/062305.b/E-20ml8260B.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
85	1,2-Dichloroethene (total)	60.0000	60.8365	1.4	25.0
83	Xylene (total)	90.0000	91.3255	1.5	25.0
64	dichlorodifluoromethane	30.0000	33.6771	12.3	25.0
1	Chloromethane	30.0000	29.1727	2.8	25.0
4	Vinyl Chloride	30.0000	30.1082	0.4	25.0
2	Bromomethane	30.0000	30.0668	0.2	25.0
5	Chloroethane	30.0000	29.9885	0.0	25.0
11	Trichlorofluoromethane	30.0000	31.1276	3.8	25.0
12	1,1-Dichloroethene	30.0000	31.5960	5.3	25.0
7	Acetone	60.0000	64.4583	7.4	25.0
6	Methylene Chloride	30.0000	33.4969	11.7	25.0
0	trans-1,2-Dichloroethene	30.0000	31.4527	4.8	25.0
15	1,1-Dichloroethane	30.0000	29.2614	2.5	25.0
93	2,2-Dichloropropane	30.0000	27.1363	9.5	25.0
0	cis-1,2-Dichloroethene	30.0000	29.3838	2.1	25.0
20	2-Butanone	60.0000	63.0100	5.0	25.0
13	Bromochloromethane	30.0000	30.2184	0.7	25.0
17	Chloroform	30.0000	30.9979	3.3	25.0
22	1,1,1-Trichloroethane	30.0000	30.1991	0.7	25.0
23	Carbon Tetrachloride	30.0000	30.2870	1.0	25.0
94	1,1-Dichloropropene	30.0000	29.2959	2.3	25.0
30	Benzene	30.0000	30.0427	0.1	25.0
16	1,2-Dichloroethane	30.0000	31.2290	4.1	25.0
90	Fluorobenzene	10.0000	10.0000	0.0	25.0
29	Trichloroethene	30.0000	30.4880	1.6	25.0
26	1,2-Dichloropropane	30.0000	28.1933	6.0	25.0
34	Dibromomethane	30.0000	29.8901	0.4	25.0
25	Bromodichloromethane	30.0000	30.5881	2.0	25.0
28	cis-1,3-Dichloropropene	30.0000	31.6591	5.5	25.0
38	4-Methyl-2-pentanone	60.0000	59.5910	0.7	25.0
45	Toluene	30.0000	31.2871	4.3	25.0
31	trans-1,3-Dichloropropene	30.0000	32.1913	7.3	25.0
32	1,1,2-Trichloroethane	30.0000	31.7278	5.8	25.0
42	Tetrachloroethene	30.0000	31.8702	6.2	25.0
109	1,3-Dichloropropane	30.0000	30.7580	2.5	25.0
43	2-Hexanone	60.0000	59.3250	1.1	25.0
36	Dibromochloromethane	30.0000	30.7553	2.5	25.0
58	1,2-Dibromoethane	30.0000	31.8007	6.0	25.0
92	1-Chlorohexane	30.0000	29.9815	0.1	25.0

INITIAL CALIBRATION VERIFICATION

Instrument ID: E.i
Lab File ID: e8236a.d
Analysis Type: WATER

Injection Date: 23-JUN-2005 15:09
Lab Sample ID: ICV030
Method File: /chem/E.i/062305.b/E-20ml8260B.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
39	Chlorobenzene-d5	10.0000	10.0000	0.0	25.0
46	Chlorobenzene	30.0000	32.8473	9.5	25.0
47	Ethylbenzene	30.0000	31.1422	3.8	25.0
74	1,1,1,2-Tetrachloroethane	30.0000	30.5621	1.9	25.0
0	m and p-Xylene	60.0000	60.9427	1.6	25.0
0	o-Xylene	30.0000	30.3828	1.3	25.0
49	Styrene	30.0000	31.0586	3.5	25.0
37	Bromoform	30.0000	31.3237	4.4	25.0
79	isopropyl benzene	30.0000	28.8203	3.9	25.0
95	Bromobenzene	30.0000	30.8998	3.0	25.0
40	1,1,2,2-Tetrachloroethane	30.0000	30.8464	2.8	25.0
96	n-Propylbenzene	30.0000	30.7508	2.5	25.0
50	1,2,3-Trichloropropane	30.0000	31.8337	6.1	25.0
97	2-Chlorotoluene	30.0000	30.8525	2.8	25.0
98	1,3,5-Trimethylbenzene	30.0000	30.4683	1.6	25.0
99	4-Chlorotoluene	30.0000	31.5976	5.3	25.0
100	tert-Butylbenzene	30.0000	30.4885	1.6	25.0
101	1,2,4-Trimethylbenzene	30.0000	31.0845	3.6	25.0
102	sec-Butylbenzene	30.0000	32.1733	7.2	25.0
103	4-Isopropyltoluene	30.0000	29.6761	1.1	25.0
61	m-Dichlorobenzene	30.0000	31.9820	6.6	25.0
91	1,4-Dichlorobenzene-d4	10.0000	10.0000	0.0	25.0
62	p-dichlorobenzene	30.0000	30.2887	1.0	25.0
104	n-Butylbenzene	30.0000	30.9476	3.2	25.0
63	o-Dichlorobenzene	30.0000	30.2357	0.8	25.0
75	1,2-Dibromo-3-chloropropane	30.0000	30.8341	2.8	25.0
105	1,2,4-Trichlorobenzene	30.0000	31.2448	4.1	25.0
106	Hexachlorobutadiene	30.0000	30.3000	1.0	25.0
107	Napthalene	30.0000	29.8471	0.5	25.0
108	1,2,3-Trichlorobenzene	30.0000	32.1902	7.3	25.0

FORM 8
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5187161 SAS No.: 8260B SDG No.: D5F250124

Lab File ID (Standard): E8232 Date Analyzed: 06/23/05

Instrument ID: E Time Analyzed: 1251

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) N

		IS1(CBZ) AREA #	RT #	IS2 AREA #	RT #	IS3(DCB) AREA #	RT #
	12 HOUR STD	172313	12.76	821312	8.30	306275	15.75
	UPPER LIMIT	344626	13.26	1642624	8.80	612550	16.25
	LOWER LIMIT	86156	12.26	410656	7.80	153138	15.25
	CLIENT SAMPLE NO.						
01	ICV030	178875	12.74	880625	8.30	317593	15.75
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
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16							
17							
18							
19							
20							
21							
22							

IS1 (CBZ) = Chlorobenzene-d5
IS2 = Fluorobenzene
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

FORM 8
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5187161 SAS No.: 8260B SDG No.: D5F250124

Lab File ID (Standard): E8439 Date Analyzed: 07/05/05

Instrument ID: E Time Analyzed: 1107

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) N

		IS1(CBZ) AREA	#	RT	#	IS2 AREA	#	RT	#	IS3(DCB) AREA	#	RT	#
	12 HOUR STD	198777		12.71		879129		8.25		336503		15.72	
	UPPER LIMIT	397554		13.21		1758258		8.75		673006		16.22	
	LOWER LIMIT	99388		12.21		439564		7.75		168252		15.22	
	CLIENT SAMPLE NO.												
01	LCS	192280		12.72		833515		8.28		342197		15.74	
02	LCSD	197266		12.74		862960		8.28		339567		15.74	
03	PBLK	196731		12.74		824985		8.30		333673		15.75	
04	BH-D-1112	186836		12.74		810685		8.30		316333		15.74	
05	BH-C-1112	192054		12.74		826983		8.30		324323		15.74	
06													
07													
08													
09													
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22													

IS1 (CBZ) = Chlorobenzene-d5
IS2 = Fluorobenzene
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Volatile GC/MS

CLP-Like Forms

Lot ID: D5F250124

Client: Ashland Chemical Company

Method: SW846 8260B

Associated Samples: 001, 003, 007, 008, 008MS, 008MSD

Batch: 5186179

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	TB-062405
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-001
Matrix:	WATER	**Lab WorkOrder:**	HED621AA
% Moisture:	N/A	**Date/Time Collected:**	06/24/05 00:00
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 10:34
Sample Aliquot:	20 mL	**Instrument ID:**	R2
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	** 0.20	** 0.20	** 1.0	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	88	62	128	
2037-26-5	Toluene-d8	100	77	117	
1868-53-7	Dibromofluoromethane	93	73	118	
460-00-4	4-Bromofluorobenzene	89	78	118	

U Result is less than the method detection limit (MDL).

Form 1 Analysis Data Sheet Equivalent

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	FB-062405
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-003
Matrix:	WATER	**Lab WorkOrder:**	HED661AA
% Moisture:	N/A	**Date/Time Collected:**	06/24/05 09:30
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 10:54
Sample Aliquot:	20 mL	**Instrument ID:**	R2
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	** 0.20	** 0.20	** 1.0	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	90	62	128	
2037-26-5	Toluene-d8	94	77	117	
1868-53-7	Dibromofluoromethane	90	73	118	
460-00-4	4-Bromofluorobenzene	93	78	118	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-9E-1216
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-007
Matrix:	WATER	**Lab WorkOrder:**	HED7C1AA
% Moisture:	N/A	**Date/Time Collected:**	06/24/05 08:00
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 11:13
Sample Aliquot:	20 mL	**Instrument ID:**	R2
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	** 0.20	** 0.20	** 1.0	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	88	62	128	
2037-26-5	Toluene-d8	94	77	117	
1868-53-7	Dibromofluoromethane	100	73	118	
460-00-4	4-Bromofluorobenzene	92	78	118	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-E-1216
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-008
Matrix:	WATER	**Lab WorkOrder:**	HED7E1AA
% Moisture:	N/A	**Date/Time Collected:**	06/24/05 11:00
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 11:33
Sample Aliquot:	20 mL	**Instrument ID:**	R2
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	** 0.20	** 0.20	** 1.0	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	88	62	128	
2037-26-5	Toluene-d8	105	77	117	
1868-53-7	Dibromofluoromethane	96	73	118	
460-00-4	4-Bromofluorobenzene	100	78	118	

U Result is less than the method detection limit (MDL).

J Estimated result. Result is less than RL.

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXA4BQK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	BH-D-1112	108	102	98	110	00
02	BH-C-1112	102	93	92	109	00
03	METHOD BLK. HEX3M1AA	98	90	85	92	00
04	LCS HEX3M1AC	119	112	106	117	00
05	LCSD HEX3M1AD	109	101	104	111	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(71-126)
SRG02	= 1,2-Dichloroethane-d4	(61-129)
SRG03	= Toluene-d8	(68-128)
SRG04	= 4-Bromofluorobenzene	(80-128)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXA4DQK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	BH-B-0102	104	118	97	89	00
02	BH-B-0506	99	110	98	93	00
03	BH-A-0102	101	112	95	86	00
04	BH-A-0506	100	119	89	86	00
05	BH-9A-0506	104	119	97	93	00
06	AC-BH002-0405	95	108	95	95	00
07	AC-BH002-0708	99	106	96	96	00
08	METHOD BLK. HEP4F1AA	104	111	102	88	00
09	LCS HEP4F1AC	99	107	100	91	00
10	LCSD HEP4F1AD	100	103	97	86	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(71-126)
SRG02	= 1,2-Dichloroethane-d4	(61-129)
SRG03	= Toluene-d8	(68-128)
SRG04	= 4-Bromofluorobenzene	(80-128)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXI25QK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	TB-062405	93	88	100	89	00
02	FB-062405	90	90	94	93	00
03	BH-9E-1216	100	88	94	92	00
04	BH-E-1216	96	88	105	100	00
05	METHOD BLK. HEV4K1AA	100	90	103	92	00
06	LCS HEV4K1AC	100	97	111	102	00
07	BH-E-1216 D	92	85	100	96	00
08	BH-E-1216 S	93	89	105	96	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(73-118)
SRG02	= 1,2-Dichloroethane-d4	(62-128)
SRG03	= Toluene-d8	(77-117)
SRG04	= 4-Bromofluorobenzene	(78-118)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5G050000-179C
Matrix:	WATER	**Lab WorkOrder:**	HEV4K1AC
% Moisture:	N/A	**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 09:35
Sample Aliquot:	20 mL	**Instrument ID:**	R2
Dilution Factor:	1		

Analyte	True	Found	%Rec	Q	Limits
Benzene	10.0	9.24	92		75 - 120
Toluene	10.0	9.71	97		78 - 118
Trichloroethene	10.0	10.4	104		79 - 122
Chlorobenzene	10.0	9.94	99		78 - 118
1,1-Dichloroethene	10.0	9.70	97		66 - 132

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	97	62	128	
2037-26-5	Toluene-d8	111	77	117	
1868-53-7	Dibromofluoromethane	100	73	118	
460-00-4	4-Bromofluorobenzene	102	78	118	

U Result is less than the method detection limit (MDL).

Form 3 LCS Analysis Data Sheet Equivalent

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-E-1216
Lot/SDG Number:	D5F250124	**MS Lab Sample ID:**	D5F250124-008S
Matrix:	WATER	**MS Lab WorkOrder:**	HED7E1AC
% Moisture:	N/A	**Date/Time Collected:**	06/24/05 11:00
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 11:53
MS Sample Aliquot:	20 mL	**Instrument ID:**	R2
MS Dilution Factor:	1		

Analyte	Spike Amount	Sample Result	C	MS Result	C	% Rec	Q	QC Limit
1,1-Dichloroethene	10.0	** 0.14	U	8.82		88		66 - 132
Benzene	10.0	0.33	J	9.49		92		75 - 120
Chlorobenzene	10.0	** 0.17	U	9.70		97		78 - 118
Toluene	10.0	** 0.17	U	9.86		99		78 - 118
Trichloroethene	10.0	** 0.16	U	9.76		98		79 - 122

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	89	62	128	
460-00-4	4-Bromofluorobenzene	96	78	118	
1868-53-7	Dibromofluoromethane	93	73	118	
2037-26-5	Toluene-d8	105	77	117	

U Result is less than the method detection limit (MDL).

J Estimated result. Result is less than RL.

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-E-1216
Lot/SDG Number:	D5F250124	**MSD Lab Sample ID:**	D5F250124-008D
Matrix:	WATER	**MSD Lab WorkOrder:**	HED7E1AD
% Moisture:	N/A	**Date/Time Collected:**	06/24/05 11:00
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 11:53
MSD Sample Aliquot:	20 mL	**Instrument ID:**	R2
MSD Dilution Factor:	1		

Analyte	Spike Amount	Sample Result	C	MSD Result	C	% Rec	Q	RPD	Q	QC Limits	
										% Rec	RPD
1,1-Dichloroethene	10.0	** 0.14	U	9.40		94		6.3		66 - 132	26
Benzene	10.0	0.33	J	9.35		90		1.5		75 - 120	21
Chlorobenzene	10.0	** 0.17	U	9.95		100		2.5		78 - 118	20
Toluene	10.0	** 0.17	U	9.98		100		1.2		78 - 118	22
Trichloroethene	10.0	** 0.16	U	9.65		97		1.1		79 - 122	23

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	89	62	128	
460-00-4	4-Bromofluorobenzene	96	78	118	
1868-53-7	Dibromofluoromethane	93	73	118	
2037-26-5	Toluene-d8	105	77	117	

U Result is less than the method detection limit (MDL).

J Estimated result. Result is less than RL.

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5G050000-179B
Matrix:	WATER	**Lab WorkOrder:**	HEV4K1AA
% Moisture:		**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/L	**Date/Time Extracted:**	07/01/05 07:49
QC Batch ID:	5186179	**Date/Time Analyzed:**	07/01/05 10:14
Sample Aliquot:	20 mL	**Instrument ID:**	R2
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	0.20	0.20	1.0	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	90	62	128	
2037-26-5	Toluene-d8	103	77	117	
1868-53-7	Dibromofluoromethane	100	73	118	
460-00-4	4-Bromofluorobenzene	92	78	118	

U Result is less than the method detection limit (MDL).

SW846 8260B METHOD BLANK SUMMARY

BLANK WORKORDER NO.: HEV4K1AA

Lab Name: Severn Trent Laboratories, Inc.

Lab Code: STLDEN SDG Number:

Lab File ID: RR2759.D Lot Number: D5F250124

Date Analyzed: 07/01/05 Time Analyzed: 10:14

Matrix: WATER Date Extracted: 07/01/05

GC Column: HP624 ID: .32 Extraction Method: 5030B/8260B

Instrument ID: R2 Level: (low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS, LCSD, MS , MSD:

	CLIENT ID.	SAMPLE WORK ORDER #	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	TB-062405	HED621AA	RR2760.D	07/01/05	10:34
02	FB-062405	HED661AA	RR2761.D	07/01/05	10:54
03	BH-9E-1216	HED7C1AA	RR2762.D	07/01/05	11:13
04	BH-E-1216	HED7E1AA	RR2763.D	07/01/05	11:33
05	BH-E-1216	HED7E1AC S	RR2764.D	07/01/05	11:53
06	BH-E-1216	HED7E1AD D	RR2765.D	07/01/05	12:13
07	CHECK SAMPLE	HEV4K1AC C	RR2757.D	07/01/05	09:35
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

COMMENTS:

FORM IV

5A
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5186179 SAS No.: 8260B SDG No.: D5F250124

Lab File ID: RR2688 BFB Injection Date: 06/29/05

Instrument ID: R2 BFB Injection Time: 2139

GC Column: HP624 ID: 0.32 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	25.9
75	30.0 - 60.0% of mass 95	56.9
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.3
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	74.9
175	5.0 - 9.0% of mass 174	5.4 (7.3)1
176	95.0 - 101.0% of mass 174	74.8 (99.9)1
177	5.0 - 9.0% of mass 176	5.9 (7.9)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SUPP002	SUPP002	RR2689	06/29/05	2150
02	SUPP001	SUPP001	RR2690	06/29/05	2210
03	SUPP005	SUPP005	RR2691	06/29/05	2229
04	SUPP010	SUPP010	RR2692	06/29/05	2249
05	SUPP030	SUPP030	RR2693	06/29/05	2308
06	SUPP060	SUPP060	RR2694	06/29/05	2328
07	MAIN001	MAIN001	RR2695	06/29/05	2347
08	MAIN002	MAIN002	RR2696	06/30/05	0007
09	MAIN005	MAIN005	RR2697	06/30/05	0026
10	MAIN010	MAIN010	RR2698	06/30/05	0045
11	MAIN030	MAIN030	RR2699	06/30/05	0105
12	MAIN060	MAIN060	RR2700	06/30/05	0124
13	ICV030	ICV030	RR2701	06/30/05	0143
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5186179 SAS No.: 8260B SDG No.: D5F250124

Lab File ID: RR2752 BFB Injection Date: 07/01/05

Instrument ID: R2 BFB Injection Time: 0749

GC Column: HP624 ID: 0.32 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	30.1
75	30.0 - 60.0% of mass 95	58.9
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.5
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	70.4
175	5.0 - 9.0% of mass 174	5.2 (7.3)1
176	95.0 - 101.0% of mass 174	69.4 (98.6)1
177	5.0 - 9.0% of mass 176	5.1 (7.4)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SUPP010	SUPP010	RR2754	07/01/05	0836
02	MAIN010	MAIN010	RR2755	07/01/05	0856
03	LCS	LCS	RR2757	07/01/05	0935
04	VBLK	VBLK	RR2759	07/01/05	1014
05	TB-062405	HED621AA	RR2760	07/01/05	1034
06	FB-062405	HED661AA	RR2761	07/01/05	1054
07	BH-9E-1216	HED7C1AA	RR2762	07/01/05	1113
08	BH-E-1216	HED7E1AA	RR2763	07/01/05	1133
09	BH-E-1216	HED7E1AC	RR2764	07/01/05	1153
10	BH-E-1216	HED7E1AD	RR2765	07/01/05	1213
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

Report Date: 05-Jul-2005 09:53

Calibration History

Method : /chem/R2.i/070105.b/R2-20ml-h2o.m
Start Cal Date: 29-JUN-2005 21:50
End Cal Date : 30-JUN-2005 01:24

Initial Calibration

Injection Date	Sublist	Calibration File
Cal Level: 1 , Cal Amount: 1.00000		
29-JUN-2005 23:47	1-main	/chem/R2.i/062905i.b/rr2695.d
29-JUN-2005 22:10	2-supp	/chem/R2.i/062905i.b/rr2690.d
Cal Level: 2 , Cal Amount: 2.00000		
30-JUN-2005 00:07	1-main	/chem/R2.i/062905i.b/rr2696.d
29-JUN-2005 21:50	2-supp	/chem/R2.i/062905i.b/rr2689.d
Cal Level: 3 , Cal Amount: 5.00000		
30-JUN-2005 00:26	1-main	/chem/R2.i/062905i.b/rr2697.d
29-JUN-2005 22:29	2-supp	/chem/R2.i/062905i.b/rr2691.d
Cal Level: 4 , Cal Amount: 10.0000		
30-JUN-2005 00:45	1-main	/chem/R2.i/062905i.b/rr2698.d
29-JUN-2005 22:49	2-supp	/chem/R2.i/062905i.b/rr2692.d
Cal Level: 5 , Cal Amount: 30.0000		
30-JUN-2005 01:05	1-main	/chem/R2.i/062905i.b/rr2699.d
29-JUN-2005 23:08	2-supp	/chem/R2.i/062905i.b/rr2693.d
Cal Level: 6 , Cal Amount: 60.0000		
30-JUN-2005 01:24	1-main	/chem/R2.i/062905i.b/rr2700.d
29-JUN-2005 23:28	2-supp	/chem/R2.i/062905i.b/rr2694.d

Continuing Calibration

01-JUL-2005 08:36	2-supp	/chem/R2.i/070105.b/rr2754.d
01-JUL-2005 08:56	1-main	/chem/R2.i/070105.b/rr2755.d

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 29-JUN-2005 21:50
End Cal Date : 30-JUN-2005 01:24
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/R2.i/070105.b/R2-20ml-h2o.m
Cal Date : 01-Jul-2005 14:09 zhouh

Calibration File Names:
Level 1: /chem/R2.i/062905i.b/rr2695.d
Level 2: /chem/R2.i/062905i.b/rr2696.d
Level 3: /chem/R2.i/062905i.b/rr2697.d
Level 4: /chem/R2.i/062905i.b/rr2698.d
Level 5: /chem/R2.i/062905i.b/rr2699.d
Level 6: /chem/R2.i/062905i.b/rr2700.d

	Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
M	1 1,2-Dichloroethene (total)	0.21923	0.20362	0.21719	0.18234	0.19631	0.20139	AVRG		0.20335		6.73700
M	2 Xylene (total)	4.14066	3.61373	3.85482	3.83047	3.57519	3.63058	AVRG		3.77424		5.68184
	3 dichlorodifluoromethane	0.49170	0.45639	0.49625	0.36996	0.41725	0.41129	AVRG		0.44047		11.28376
	4 dichlorotetrafluoroethane	0.22237	0.18370	0.20400	0.21918	0.21055	0.20371	AVRG		0.20726		6.68411
	5 Chloromethane	0.40822	0.39877	0.37027	0.32068	0.35247	0.33263	AVRG		0.36384		9.67618
	6 Vinyl Chloride	0.37819	0.36471	0.36226	0.28345	0.31611	0.27962	AVRG		0.33072		13.15435
	7 Ethylene Oxide	+++++	0.00230	0.00295	0.00334	0.00320	0.00322	AVRG		0.00300		13.90194
	8 Bromomethane	0.24076	0.21083	0.20909	0.17232	0.19759	0.18692	AVRG		0.20292		11.56473
	9 Chloroethane	0.13573	0.13682	0.11978	0.10880	0.11758	0.11217	AVRG		0.12181		9.73499

STL Denver

INITIAL CALIBRATION DATA

tart Cal Date : 29-JUN-2005 21:50
nd Cal Date : 30-JUN-2005 01:24
uant Method : ISTD
arget Version : 3.40
ntegrator : HP RTE
ethod file : /chem/R2.i/070105.b/R2-20ml-h2o.m
al Date : 01-Jul-2005 14:09 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
10 Dichlorofluoromethane	0.67743	0.42399	0.58401	0.61056	0.58320	0.56211	AVRG		0.57355		14.55831
11 Trichlorofluoromethane	0.51603	0.47403	0.48279	0.38700	0.47307	0.45196	AVRG		0.46415		9.30005
12 Ethanol	7516	10302	18079	41421	140421	+++++	LINR	1.43325	0.00094		0.99457
13 1,2-dichloro-1,1,2-trifluoroe	0.22080	0.19812	0.19331	0.20493	0.18329	0.17974	AVRG		0.19670		7.64050
14 Ethyl Ether	0.11673	0.09420	0.09221	0.09108	0.08339	0.08297	AVRG		0.09343		13.20186
15 2,2-dichloro-1,1,1-trifluoroe	0.41661	0.38666	0.36426	0.38162	0.35226	0.34501	AVRG		0.37440		7.00703
16 Acrolein	1253	3684	6898	18167	86726	291537	QUAD	1.53967	388	-626	0.99762
17 Trichlorotrifluoroethane	0.20376	0.17305	0.17456	0.17558	0.16419	0.17475	AVRG		0.17765		7.57894
18 Acetone	+++++	0.03572	0.03272	0.02646	0.02760	0.02595	AVRG		0.02969		14.52378
19 1,1-Dichloroethene	0.21232	0.19869	0.21752	0.17806	0.18303	0.19061	AVRG		0.19671		8.04718
20 2-Propanol	12086	19407	49102	89710	287389	611110	WLINR	0.32581	0.00562		0.99198
21 Iodomethane	0.46215	0.47033	0.47546	0.41307	0.43161	0.43835	AVRG		0.44850		5.49183
22 Acetonitrile	0.00987	0.00978	0.00922	0.00838	0.00890	0.00802	AVRG		0.00903		8.22781
23 Methyl acetate	0.08795	0.06654	0.06667	0.06678	0.06199	0.06564	AVRG		0.06926		13.47606
24 Carbon Disulfide	1.05367	0.97085	0.89111	0.93258	0.86469	0.90711	AVRG		0.93667		7.24159
25 Allyl Chloride	0.50523	0.47182	0.42215	0.41933	0.39514	0.42202	AVRG		0.43928		9.30094
26 tert-Butyl alcohol	0.00705	0.00669	0.00677	0.00630	0.00697	0.00602	AVRG		0.00663		6.04320

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 29-JUN-2005 21:50
End Cal Date : 30-JUN-2005 01:24
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/R2.i/070105.b/R2-20ml-h2o.m
Cal Date : 01-Jul-2005 14:09 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
27 Methylene Chloride	+++++	52510	102755	193932	547641	1171998	WLINR	-0.11302	0.17429		0.99644
28 Acrylonitrile	0.02343	0.02325	0.02294	0.02170	0.02407	0.02112	AVRG		0.02275		4.92173
29 Methyl t-butyl ether	0.32695	0.31296	0.31656	0.32116	0.29677	0.29307	AVRG		0.31124		4.34878
30 trans-1,2-Dichloroethene	0.22721	0.21337	0.22052	0.18676	0.19755	0.20082	AVRG		0.20770		7.35199
31 Hexane	0.35765	0.38115	0.30749	0.31456	0.29750	0.30652	AVRG		0.32748		10.30631
32 Vinyl acetate	62905	143435	279359	506186	1649515	3013234	WLINR	-0.08994	0.25124		0.99809
33 Isopropyl ether	0.08661	0.08697	0.09637	0.08250	0.08254	0.08862	AVRG		0.08727		5.84930
34 1,1-Dichloroethane	0.52813	0.50230	0.54940	0.47248	0.46719	0.48534	AVRG		0.50081		6.48965
35 Chloroprene	0.44690	0.40836	0.43891	0.39975	0.38637	0.41820	AVRG		0.41641		5.56328
36 ETBE	0.64168	0.55443	0.53145	0.54221	0.50649	0.48550	AVRG		0.54363		9.95352
37 2-Butanone	0.04887	0.04289	0.04375	0.03556	0.04058	0.03835	AVRG		0.04166		11.11155
38 Ethyl Acetate	+++++	0.10117	0.09410	0.09253	0.09030	0.09131	AVRG		0.09388		4.59481
39 Propionitrile	0.00910	0.00788	0.00845	0.00690	0.00806	0.00773	AVRG		0.00802		9.17604
40 cis-1,2-Dichloroethene	0.21125	0.19387	0.21385	0.17792	0.19507	0.20197	AVRG		0.19899		6.61120
41 2,2-Dichloropropane	0.41132	0.38825	0.41587	0.35407	0.35355	0.35312	AVRG		0.37936		7.84353
42 Methacrylonitrile	0.06848	0.06432	0.06803	0.05757	0.06597	0.05636	AVRG		0.06345		8.28363
43 Bromochloromethane	0.08162	0.08100	0.08346	0.07329	0.07770	0.07460	AVRG		0.07861		5.20020

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STL Denver

INITIAL CALIBRATION DATA

:art Cal Date : 29-JUN-2005 21:50
id Cal Date : 30-JUN-2005 01:24
iant Method : ISTD
irget Version : 3.40
itegrator : HP RTE
ethod file : /chem/R2.i/070105.b/R2-20ml-h2o.m
il Date : 01-Jul-2005 14:09 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
44 Chloroform	0.57061	0.53850	0.57177	0.47442	0.51020	0.49064	AVRG		0.52602		7.79283
45 Tetrahydrofuran	+++++	0.02067	0.01890	0.01836	0.01727	0.01772	AVRG		0.01858		7.09555
47 1,1,1-Trichloroethane	0.46711	0.42067	0.45662	0.39814	0.38976	0.40553	AVRG		0.42297		7.55744
48 Isobutanol	0.00310	0.00270	0.00268	0.00253	0.00269	0.00237	AVRG		0.00268		8.99583
49 Cyclohexane	0.39898	0.39520	0.35830	0.37250	0.33554	0.35182	AVRG		0.36872		6.78167
50 1,1-Dichloropropene	0.41815	0.39257	0.41859	0.36699	0.38712	0.38462	AVRG		0.39467		5.13284
51 Carbon Tetrachloride	0.43258	0.41319	0.44670	0.40356	0.40376	0.42590	AVRG		0.42095		4.08853
53 1,2-Dichloroethane	0.32530	0.32971	0.34508	0.30363	0.31964	0.29196	AVRG		0.31922		5.94767
54 Benzene	0.81688	0.73154	0.82038	0.74040	0.70996	0.73503	AVRG		0.75903		6.23479
55 TAME	0.41151	0.33826	0.32822	0.31648	0.32822	0.33557	AVRG		0.34304		10.02357
57 n-Butanol	+++++	0.00215	0.00186	0.00163	0.00178	0.00150	AVRG		0.00178		13.81938
58 Trichloroethene	0.21029	0.19904	0.21521	0.18871	0.18634	0.19577	AVRG		0.19923		5.79503
59 2-Pentanone	0.07991	0.07115	0.06441	0.06303	0.06246	0.06251	AVRG		0.06724		10.44562
60 Methyl Methacrylate	0.01069	0.01240	0.01058	0.01108	0.01128	0.01156	AVRG		0.01126		5.90521
61 1,2-Dichloropropane	0.20767	0.19741	0.21746	0.18553	0.19228	0.19735	AVRG		0.19962		5.69177
62 Methyl cyclohexane	0.41304	0.41013	0.35194	0.38606	0.36126	0.37610	AVRG		0.38309		6.53337
63 1,4-Dioxane	+++++	0.00045	0.00050	0.00047	0.00060	0.00044	AVRG		0.00049		13.07053

STL Denver

INITIAL CALIBRATION DATA

tart Cal Date : 29-JUN-2005 21:50
nd Cal Date : 30-JUN-2005 01:24
uant Method : ISTD
arget Version : 3.40
ntegrator : HP RTE
ethod file : /chem/R2.i/070105.b/R2-20ml-h2o.m
al Date : 01-Jul-2005 14:09 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
64 Dibromomethane	0.11083	0.11886	0.12313	0.10550	0.11731	0.10942	AVRG		0.11417		5.82234
65 Bromodichloromethane	0.33144	0.31008	0.32967	0.29528	0.31949	0.32360	AVRG		0.31826		4.28226
66 2-nitropropane	+++++	0.18753	0.18324	0.20336	0.18015	0.17839	AVRG		0.18653		5.37454
67 2-Chloroethyl vinyl ether	+++++	3744	9504	22885	97132	244184	LINR	0.32252	0.22196		0.99065
68 cis-1,3-Dichloropropene	1.61573	1.54558	1.52129	1.55792	1.43667	1.53857	AVRG		1.53596		3.79829
69 4-Methyl-2-pentanone	0.57046	0.50891	0.50466	0.50530	0.48486	0.49029	AVRG		0.51075		6.01816
71 Toluene	4.04663	3.71511	3.59692	3.74864	3.41951	3.75765	AVRG		3.71408		5.57255
72 trans-1,3-Dichloropropene	1.26890	1.26248	1.28709	1.21949	1.17507	1.17276	AVRG		1.23097		4.01701
73 Ethyl methacrylate	0.56064	0.51521	0.52864	0.54478	0.49502	0.51102	AVRG		0.52589		4.54814
74 1,1,2-Trichloroethane	0.53627	0.46445	0.44378	0.46346	0.42298	0.45441	AVRG		0.46423		8.29114
75 2-Hexanone	0.39427	0.33374	0.33496	0.32278	0.31813	0.30932	AVRG		0.33553		9.04655
76 1,3-Dichloropropane	0.92063	0.83739	0.84062	0.81791	0.76079	0.78287	AVRG		0.82670		6.72905
77 Tetrachloroethene	0.99621	0.90058	0.91227	0.86871	0.80529	0.91319	AVRG		0.89937		6.94894
78 Dibromochloromethane	0.99963	0.86199	0.91225	0.93511	0.92853	0.91027	AVRG		0.92463		4.84476
79 Tetrahydrothiophene	0.07429	0.06400	0.06225	0.05979	0.06245	0.06197	AVRG		0.06413		8.04537
80 1,2-Dibromoethane	0.57816	0.55124	0.54668	0.56914	0.54287	0.54153	AVRG		0.55493		2.73077
81 1-Chlorohexane	1.71596	1.36739	1.49341	1.44554	1.36624	1.42371	AVRG		1.46871		8.88119

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STL Denver

INITIAL CALIBRATION DATA

tart Cal Date : 29-JUN-2005 21:50
nd Cal Date : 30-JUN-2005 01:24
uant Method : ISTD
arget Version : 3.40
ntegrator : HP RTE
ethod file : /chem/R2.i/070105.b/R2-20ml-h2o.m
al Date : 01-Jul-2005 14:09 zhouh

	Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	Coefficients m1	Coefficients m2	%RSD or R^2
83	Chlorobenzene	2.31007	2.11666	2.08510	2.00776	1.99027	1.99677	AVRG		2.08444		5.85139
84	1,1,1,2-Tetrachloroethane	1.03438	0.90049	0.99569	0.92555	0.84258	0.88191	AVRG		0.93010		7.76146
85	Ethylbenzene	1.14111	1.00051	1.01931	1.03765	0.93678	1.02329	AVRG		1.02644		6.46941
86	m and p-Xylene	1.40487	1.20103	1.27159	1.31135	1.22527	1.25453	AVRG		1.27811		5.69658
87	o-Xylene	1.33091	1.21167	1.31164	1.20776	1.12465	1.12153	AVRG		1.21803		7.31401
88	Styrene	2.04098	1.91413	2.03101	1.92814	1.83129	1.82267	AVRG		1.92804		4.86623
89	Bromoform	0.45083	0.40385	0.41039	0.41695	0.44421	0.44451	AVRG		0.42846		4.74965
90	isopropyl benzene	4.26259	3.58074	3.72654	3.80555	3.44603	3.67831	AVRG		3.74996		7.47218
91	c-1,4-Dichloro-2-butene	0.12548	0.12638	0.10209	0.13212	0.12413	0.14187	AVRG		0.12534		10.47750
92	Cyclohexanone	0.01649	0.01376	0.01446	0.01324	0.01529	0.01289	AVRG		0.01436		9.43779
94	1,1,2,2-Tetrachloroethane	0.55629	0.52163	0.52457	0.50718	0.52049	0.50365	AVRG		0.52230		3.57200
95	t-1,4-Dichloro-2-butene	0.07018	0.09915	0.07978	0.08284	0.09901	0.10323	AVRG		0.08903		14.92481
96	1,2,3-Trichloropropane	883	3187	7291	14766	49109	100204	WLINR	0.01772	0.06198		0.99779
97	Bromobenzene	0.65111	0.67306	0.66365	0.68391	0.63214	0.62200	AVRG		0.65431		3.65584
98	n-Propylbenzene	0.60439	0.57337	0.62134	0.61964	0.53245	0.60904	AVRG		0.59337		5.81366
99	2-Chlorotoluene	0.63588	0.60390	0.62036	0.61999	0.57589	0.61614	AVRG		0.61202		3.34125
100	1,3,5-Trimethylbenzene	2.17786	2.16683	2.17581	2.30397	2.08250	2.10401	AVRG		2.16850		3.57513

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 29-JUN-2005 21:50
End Cal Date : 30-JUN-2005 01:24
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/R2.i/070105.b/R2-20ml-h2o.m
Cal Date : 01-Jul-2005 14:09 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
101 4-Chlorotoluene	0.64813	0.59673	0.58439	0.62683	0.57570	0.60211	AVRG		0.60565		4.48816
102 tert-Butylbenzene	2.05350	1.96365	1.98081	1.85695	1.65067	1.89045	AVRG		1.89934		7.38039
103 1,2,4-Trimethylbenzene	2.06670	2.32812	2.27083	1.99457	2.00195	1.99861	AVRG		2.11013		7.11555
104 sec-Butylbenzene	0.32589	0.37484	0.38525	0.34219	0.34604	0.32354	AVRG		0.34963		7.25464
105 4-Isopropyltoluene	2.58088	2.40751	2.34325	2.31078	2.05718	2.18246	AVRG		2.31367		7.82998
106 m-Dichlorobenzene	1.29222	1.25905	1.16376	1.21780	1.10557	1.18450	AVRG		1.20382		5.59623
108 p-dichlorobenzene	1.15914	1.12094	1.13050	1.09983	1.06564	1.13197	AVRG		1.11800		2.86346
109 1,2,3-Trimethylbenzene	1.81723	2.01418	1.79551	1.86682	1.93372	1.74256	AVRG		1.86167		5.31850
110 n-Butylbenzene	2.91664	2.90301	2.94996	2.99091	2.56932	2.71040	AVRG		2.84004		5.78088
111 o-Dichlorobenzene	0.94623	1.00317	0.96413	0.94089	0.94337	0.94342	AVRG		0.95687		2.52932
112 1,2-Dibromo-3-chloropropane	+++++	0.04784	0.04595	0.04833	0.05463	0.04648	AVRG		0.04865		7.16185
113 1,2,4-Trichlorobenzene	0.49712	0.53938	0.54112	0.50435	0.48383	0.44021	AVRG		0.50100		7.52082
114 Hexachlorobutadiene	0.48519	0.46756	0.47950	0.48924	0.43468	0.40372	AVRG		0.45998		7.36255
115 Napthalene	0.56795	0.62700	0.57708	0.60233	0.61664	0.49586	AVRG		0.58114		8.17152
116 1,2,3-Trichlorobenzene	0.37701	0.40693	0.37888	0.38264	0.38176	0.32515	AVRG		0.37539		7.17447
$ 46 Dibromofluoromethane	0.32490	0.28063	0.27540	0.26046	0.26995	0.26519	AVRG		0.27942		8.37485

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 29-JUN-2005 21:50
End Cal Date : 30-JUN-2005 01:24
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/R2.i/070105.b/R2-20ml-h2o.m
Cal Date : 01-Jul-2005 14:09 zhouh

Compound	1 Level 1	2 Level 2	5 Level 3	10 Level 4	30 Level 5	60 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
$ 52 1,2-Dichloroethane-d4	0.33847	0.26913	0.26493	0.26879	0.26021	0.25157	AVRG		0.27552		11.44255
$ 70 Toluene-d8	3.29228	3.16453	2.96500	3.15593	2.96323	2.90828	AVRG		3.07487		4.91419
$ 93 Bromofluorobenzene	1.29527	1.11320	1.10212	1.28191	1.04508	1.11278	AVRG		1.15839		8.98135

Curve	Formula	Units
Averaged	Amt = Rsp/m1	Response
Linear	Amt = b + Rsp/m1	Response
Wt Linear	Amt = b + Rsp/m1	Response
Quad	Amt = b + m1*Rsp + m2*Rsp^2	Response

INITIAL CALIBRATION VERIFICATION

Instrument ID: R2.i
Lab File ID: rr2701.d
Analysis Type: WATER

Injection Date: 30-JUN-2005 01:43
Lab Sample ID: ICV030
Method File: /chem/R2.i/062905i.b/R2-20ml-h2o.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
85	1,2-Dichloroethene (total)	60.0000	59.2408	1.3	25.0
83	Xylene (total)	90.0000	85.4299	5.1	25.0
64	dichlorodifluoromethane	30.0000	30.2474	0.8	25.0
1	Chloromethane	30.0000	25.9361	13.5	25.0
4	Vinyl Chloride	30.0000	27.4527	8.5	25.0
2	Bromomethane	30.0000	28.7136	4.3	25.0
5	Chloroethane	30.0000	29.3436	2.2	25.0
11	Trichlorofluoromethane	30.0000	28.8795	3.7	25.0
7	Acetone	60.0000	56.3131	6.1	25.0
12	1,1-Dichloroethene	30.0000	30.0084	0.0	25.0
6	Methylene Chloride	30.0000	30.1735	0.6	25.0
0	trans-1,2-Dichloroethene	30.0000	30.7400	2.5	25.0
15	1,1-Dichloroethane	30.0000	30.2353	0.8	25.0
20	2-Butanone	60.0000	56.2048	6.3	25.0
0	cis-1,2-Dichloroethene	30.0000	28.5009	5.0	25.0
93	2,2-Dichloropropane	30.0000	27.4548	8.5	25.0
13	Bromochloromethane	30.0000	29.8251	0.6	25.0
17	Chloroform	30.0000	29.5228	1.6	25.0
22	1,1,1-Trichloroethane	30.0000	29.9087	0.3	25.0
94	1,1-Dichloropropene	30.0000	29.2025	2.7	25.0
23	Carbon Tetrachloride	30.0000	30.7504	2.5	25.0
16	1,2-Dichloroethane	30.0000	28.6923	4.4	25.0
30	Benzene	30.0000	29.4848	1.7	25.0
90	Fluorobenzene	10.0000	10.0000	0.0	25.0
29	Trichloroethene	30.0000	30.3806	1.3	25.0
26	1,2-Dichloropropane	30.0000	28.9052	3.6	25.0
34	Dibromomethane	30.0000	28.2338	5.9	25.0
25	Bromodichloromethane	30.0000	30.8518	2.8	25.0
28	cis-1,3-Dichloropropene	30.0000	28.1728	6.1	25.0
38	4-Methyl-2-pentanone	60.0000	50.9755	15.0	25.0
45	Toluene	30.0000	28.3396	5.5	25.0
31	trans-1,3-Dichloropropene	30.0000	28.3049	5.7	25.0
32	1,1,2-Trichloroethane	30.0000	25.9974	13.3	25.0
109	1,3-Dichloropropane	30.0000	27.3878	8.7	25.0
43	2-Hexanone	60.0000	54.7635	8.7	25.0
42	Tetrachloroethene	30.0000	28.2939	5.7	25.0
36	Dibromochloromethane	30.0000	28.3401	5.5	25.0
58	1,2-Dibromoethane	30.0000	27.6388	7.9	25.0
92	1-Chlorohexane	30.0000	23.8146	20.6	25.0

INITIAL CALIBRATION VERIFICATION

Instrument ID: R2.i
Lab File ID: rr2701.d
Analysis Type: WATER

Injection Date: 30-JUN-2005 01:43
Lab Sample ID: ICV030
Method File: /chem/R2.i/062905i.b/R2-20ml-h2o.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
39	Chlorobenzene-d5	10.0000	10.0000	0.0	25.0
46	Chlorobenzene	30.0000	28.8758	3.7	25.0
74	1,1,1,2-Tetrachloroethane	30.0000	26.2548	12.5	25.0
47	Ethylbenzene	30.0000	27.0235	9.9	25.0
0	m and p-Xylene	60.0000	59.6518	0.6	25.0
49	Styrene	30.0000	26.0017	13.3	25.0
0	o-Xylene	30.0000	25.7781	14.1	25.0
37	Bromoform	30.0000	28.6736	4.4	25.0
79	isopropyl benzene	30.0000	25.2420	15.9	25.0
40	1,1,2,2-Tetrachloroethane	30.0000	27.0555	9.8	25.0
50	1,2,3-Trichloropropane	30.0000	27.5937	8.0	25.0
95	Bromobenzene	30.0000	27.6058	8.0	25.0
96	n-Propylbenzene	30.0000	29.3936	2.0	25.0
97	2-Chlorotoluene	30.0000	29.5595	1.5	25.0
98	1,3,5-Trimethylbenzene	30.0000	27.1556	9.5	25.0
99	4-Chlorotoluene	30.0000	28.2961	5.7	25.0
100	tert-Butylbenzene	30.0000	27.7222	7.6	25.0
101	1,2,4-Trimethylbenzene	30.0000	28.2891	5.7	25.0
102	sec-Butylbenzene	30.0000	30.1784	0.6	25.0
103	4-Isopropyltoluene	30.0000	27.9839	6.7	25.0
61	m-Dichlorobenzene	30.0000	28.3826	5.4	25.0
91	1,4-Dichlorobenzene-d4	10.0000	10.0000	0.0	25.0
62	p-dichlorobenzene	30.0000	27.9036	7.0	25.0
104	n-Butylbenzene	30.0000	27.7428	7.5	25.0
63	o-Dichlorobenzene	30.0000	27.2120	9.3	25.0
75	1,2-Dibromo-3-chloropropane	30.0000	26.5552	11.5	25.0
105	1,2,4-Trichlorobenzene	30.0000	24.6808	17.7	25.0
106	Hexachlorobutadiene	30.0000	25.7512	14.2	25.0
107	Napthalene	30.0000	25.9832	13.4	25.0
108	1,2,3-Trichlorobenzene	30.0000	24.4406	18.5	25.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: R2.i
Lab File ID: rr2755.d
Analysis Type: WATER

Injection Date: 01-JUL-2005 08:56
Lab Sample ID: MAIN010
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D	
85	1,2-Dichloroethene (total)	20.0000	18.9122	5.4	50.0	
83	Xylene (total)	30.0000	29.6736	1.1	50.0	
64	dichlorodifluoromethane	10.0000	9.6926	3.1	50.0	
1	Chloromethane	10.0000	9.5648	4.4	50.0	
4	Vinyl Chloride	10.0000	9.2307	7.7	20.0	
2	Bromomethane	10.0000	9.9071	0.9	50.0	
5	Chloroethane	10.0000	9.9886	0.1	50.0	
11	Trichlorofluoromethane	10.0000	10.4085	4.1	50.0	
3	Ethanol	500.0000	409.6780	18.1	50.0	
8	Acrolein	100.0000	205.1528	105.2	50.0	<- NC
7	Acetone	40.0000	35.1687	12.1	50.0	
12	1,1-Dichloroethene	10.0000	9.4304	5.7	20.0	
21	Iodomethane	10.0000	9.4587	5.4	50.0	
68	Acetonitrile	100.0000	83.4155	16.6	50.0	
86	tert-Butyl alcohol	200.0000	175.7401	12.1	50.0	
6	Methylene Chloride	10.0000	8.9561	10.4	50.0	
9	Acrylonitrile	100.0000	85.6490	14.4	50.0	
0	trans-1,2-Dichloroethene	10.0000	9.5610	4.4	50.0	
84	Isopropyl ether	50.0000	46.7458	6.5	50.0	
15	1,1-Dichloroethane	10.0000	9.7404	2.6	50.0	
69	Chloroprene	10.0000	9.3151	6.8	50.0	
20	2-Butanone	40.0000	34.2028	14.5	50.0	
70	Propionitrile	100.0000	88.6355	11.4	50.0	
0	cis-1,2-Dichloroethene	10.0000	9.3512	6.5	50.0	
93	2,2-Dichloropropane	10.0000	9.6700	3.3	50.0	
72	Methacrylonitrile	100.0000	89.7280	10.3	50.0	
13	Bromochloromethane	10.0000	9.0726	9.3	50.0	
17	Chloroform	10.0000	8.8943	11.1	20.0	
22	1,1,1-Trichloroethane	10.0000	9.4216	5.8	50.0	
71	Isobutanol	200.0000	157.0974	21.5	50.0	
94	1,1-Dichloropropene	10.0000	9.6987	3.0	50.0	
23	Carbon Tetrachloride	10.0000	9.9281	0.7	50.0	
16	1,2-Dichloroethane	10.0000	9.1849	8.2	50.0	
30	Benzene	10.0000	9.4154	5.8	50.0	
88	n-Butanol	200.0000	160.7165	19.6	50.0	
29	Trichloroethene	10.0000	9.8184	1.8	50.0	
26	1,2-Dichloropropane	10.0000	9.5262	4.7	20.0	
57	1,4-Dioxane	500.0000	443.9770	11.2	50.0	
34	Dibromomethane	10.0000	8.6457	13.5	50.0	

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: R2.i
Lab File ID: rr2755.d
Analysis Type: WATER

Injection Date: 01-JUL-2005 08:56
Lab Sample ID: MAIN010
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
25	Bromodichloromethane	10.0000	9.0291	9.7	50.0
28	cis-1,3-Dichloropropene	10.0000	8.5367	14.6	50.0
38	4-Methyl-2-pentanone	40.0000	34.6414	13.4	50.0
45	Toluene	10.0000	9.6961	3.0	20.0
31	trans-1,3-Dichloropropene	10.0000	9.0844	9.2	50.0
32	1,1,2-Trichloroethane	10.0000	8.9689	10.3	50.0
109	1,3-Dichloropropane	10.0000	8.9590	10.4	50.0
43	2-Hexanone	40.0000	35.1845	12.0	50.0
42	Tetrachloroethene	10.0000	9.6219	3.8	50.0
36	Dibromochloromethane	10.0000	9.2403	7.6	50.0
58	1,2-Dibromoethane	10.0000	9.3455	6.5	50.0
92	1-Chlorohexane	10.0000	9.7033	3.0	50.0
46	Chlorobenzene	10.0000	9.5722	4.3	50.0
74	1,1,1,2-Tetrachloroethane	10.0000	8.8029	12.0	50.0
47	Ethylbenzene	10.0000	9.3882	6.1	20.0
0	m and p-Xylene	20.0000	20.0346	0.2	50.0
49	Styrene	10.0000	9.6401	3.6	50.0
0	o-Xylene	10.0000	9.6390	3.6	50.0
37	Bromoform	10.0000	8.7230	12.8	50.0
79	isopropyl benzene	10.0000	9.6461	3.5	50.0
76	Cyclohexanone	400.0000	342.2525	14.4	50.0
40	1,1,2,2-Tetrachloroethane	10.0000	9.1977	8.0	50.0
50	1,2,3-Trichloropropane	10.0000	9.0024	10.0	50.0
95	Bromobenzene	10.0000	8.9008	11.0	50.0
96	n-Propylbenzene	10.0000	9.7851	2.1	50.0
97	2-Chlorotoluene	10.0000	9.7124	2.9	50.0
98	1,3,5-Trimethylbenzene	10.0000	9.6027	4.0	50.0
99	4-Chlorotoluene	10.0000	9.9344	0.7	50.0
100	tert-Butylbenzene	10.0000	8.9250	10.8	50.0
101	1,2,4-Trimethylbenzene	10.0000	9.6801	3.2	50.0
102	sec-Butylbenzene	10.0000	9.9047	1.0	50.0
103	4-Isopropyltoluene	10.0000	9.8328	1.7	50.0
61	m-Dichlorobenzene	10.0000	8.9308	10.7	50.0
62	p-dichlorobenzene	10.0000	9.6833	3.2	50.0
104	n-Butylbenzene	10.0000	10.2068	2.1	50.0
63	o-Dichlorobenzene	10.0000	9.0566	9.4	50.0
75	1,2-Dibromo-3-chloropropane	10.0000	8.4417	15.6	50.0
105	1,2,4-Trichlorobenzene	10.0000	9.4661	5.3	50.0
106	Hexachlorobutadiene	10.0000	10.4824	4.8	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: R2.i
Lab File ID: rr2755.d
Analysis Type: WATER

Injection Date: 01-JUL-2005 08:56
Lab Sample ID: MAIN010
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
107 Napthalene	10.0000	9.3141	6.9	50.0
108 1,2,3-Trichlorobenzene	10.0000	9.5246	4.8	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: R2.i
Lab File ID: rr2755.d
Analysis Type: WATER
Lab Sample ID: MAIN010
Quant Type: ISTD

Injection Date: 01-JUL-2005 08:56
Init. Calibration Date(s): 06/29/5 06/30/5
Init. Calibration Times: 21:50 01:24
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

	COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D
M	1 1,2-Dichloroethene (total)	0.203	0.192	0.010	5.4	50.0
M	2 Xylene (total)	3.774	3.735	0.010	1.0	50.0
	3 dichlorodifluoromethane	0.440	0.427	0.010	3.1	50.0
	5 Chloromethane	0.364	0.348	0.100	4.4	50.0
	6 Vinyl Chloride	0.331	0.305	0.020	7.7	20.0
	8 Bromomethane	0.203	0.201	0.010	0.9	50.0
	9 Chloroethane	0.122	0.122	0.010	0.1	50.0
	11 Trichlorofluoromethane	0.464	0.483	0.010	-4.1	50.0
	12 Ethanol	0.001	0.001	0.000	N/A	N/A
	16 Acrolein	387.692	0.005	0.001	N/A	N/A
	19 1,1-Dichloroethene	0.197	0.186	0.020	5.7	20.0
	18 Acetone	0.030	0.026	0.001	12.1	50.0
	21 Iodomethane	0.448	0.424	0.010	5.4	50.0
	22 Acetonitrile	0.009	0.008	0.000	16.6	50.0
	27 Methylene Chloride	0.174	0.176	0.010	N/A	N/A
	26 tert-Butyl alcohol	0.007	0.006	0.000	12.1	50.0
	28 Acrylonitrile	0.023	0.019	0.001	14.4	50.0
	30 trans-1,2-Dichloroethene	0.208	0.199	0.010	4.4	50.0
	34 1,1-Dichloroethane	0.501	0.488	0.100	2.6	50.0
	33 Isopropyl ether	0.087	0.082	0.010	6.5	50.0
	35 Chloroprene	0.416	0.388	0.010	6.8	50.0
	40 cis-1,2-Dichloroethene	0.199	0.186	0.010	6.5	50.0
	37 2-Butanone	0.042	0.036	0.010	14.5	50.0
	41 2,2-Dichloropropane	0.379	0.367	0.010	3.3	50.0
	39 Propionitrile	0.008	0.007	0.001	11.4	50.0
	42 Methacrylonitrile	0.063	0.057	0.010	10.3	50.0
	43 Bromochloromethane	0.079	0.071	0.010	9.3	50.0
	44 Chloroform	0.526	0.468	0.020	11.1	20.0
	47 1,1,1-Trichloroethane	0.423	0.399	0.010	5.8	50.0
	50 1,1-Dichloropropene	0.395	0.383	0.010	3.0	50.0
	51 Carbon Tetrachloride	0.421	0.418	0.010	0.7	50.0
	48 Isobutanol	0.003	0.002	0.000	21.5	50.0
	54 Benzene	0.759	0.715	0.010	5.8	50.0
	53 1,2-Dichloroethane	0.319	0.293	0.010	8.2	50.0
	57 n-Butanol	0.002	0.001	0.000	19.6	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: R2.i
Lab File ID: rr2755.d
Analysis Type: WATER
Lab Sample ID: MAIN010
Quant Type: ISTD

Injection Date: 01-JUL-2005 08:56
Init. Calibration Date(s): 06/29/5 06/30/5
Init. Calibration Times: 21:50 01:24
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

	COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D
58	Trichloroethene	0.199	0.196	0.010	1.8	50.0
61	1,2-Dichloropropane	0.200	0.190	0.020	4.7	20.0
64	Dibromomethane	0.114	0.099	0.010	13.5	50.0
63	1,4-Dioxane	0.000	0.000	0.000	11.2	50.0
65	Bromodichloromethane	0.318	0.287	0.010	9.7	50.0
68	cis-1,3-Dichloropropene	1.536	1.311	0.010	14.6	50.0
69	4-Methyl-2-pentanone	0.511	0.442	0.010	13.4	50.0
71	Toluene	3.714	3.601	0.020	3.0	20.0
72	trans-1,3-Dichloropropene	1.231	1.118	0.010	9.2	50.0
74	1,1,2-Trichloroethane	0.464	0.416	0.010	10.3	50.0
76	1,3-Dichloropropane	0.827	0.741	0.010	10.4	50.0
77	Tetrachloroethene	0.899	0.865	0.010	3.8	50.0
75	2-Hexanone	0.336	0.295	0.010	12.0	50.0
78	Dibromochloromethane	0.925	0.854	0.010	7.6	50.0
80	1,2-Dibromoethane	0.555	0.519	0.010	6.5	50.0
81	1-Chlorohexane	1.469	1.425	0.010	3.0	50.0
83	Chlorobenzene	2.084	1.995	0.300	4.3	50.0
84	1,1,1,2-Tetrachloroethane	0.930	0.819	0.010	12.0	50.0
85	Ethylbenzene	1.026	0.964	0.020	6.1	20.0
86	m and p-Xylene	1.278	1.280	0.010	-0.2	50.0
87	o-Xylene	1.218	1.174	0.010	3.6	50.0
88	Styrene	1.928	1.859	0.010	3.6	50.0
89	Bromoform	0.428	0.374	0.101	12.8	50.0
90	isopropyl benzene	3.750	3.617	0.010	3.5	50.0
92	Cyclohexanone	0.014	0.012	0.001	14.4	50.0
94	1,1,2,2-Tetrachloroethane	0.522	0.480	0.300	8.0	50.0
97	Bromobenzene	0.654	0.582	0.010	11.0	50.0
96	1,2,3-Trichloropropane	0.062	0.055	0.010	N/A	N/A
98	n-Propylbenzene	0.593	0.581	0.010	2.1	50.0
99	2-Chlorotoluene	0.612	0.594	0.010	2.9	50.0
100	1,3,5-Trimethylbenzene	2.168	2.082	0.010	4.0	50.0
101	4-Chlorotoluene	0.606	0.602	0.010	0.7	50.0
102	tert-Butylbenzene	1.899	1.695	0.010	10.8	50.0
103	1,2,4-Trimethylbenzene	2.110	2.043	0.010	3.2	50.0
104	sec-Butylbenzene	0.350	0.346	0.010	1.0	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: R2.i
Lab File ID: rr2755.d
Analysis Type: WATER
Lab Sample ID: MAIN010
Quant Type: ISTD

Injection Date: 01-JUL-2005 08:56
Init. Calibration Date(s): 06/29/5 06/30/5
Init. Calibration Times: 21:50 01:24
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D
106 m-Dichlorobenzene	1.204	1.075	0.010	10.7	50.0
105 4-Isopropyltoluene	2.314	2.275	0.010	1.7	50.0
108 p-dichlorobenzene	1.118	1.083	0.010	3.2	50.0
110 n-Butylbenzene	2.840	2.899	0.010	-2.1	50.0
111 o-Dichlorobenzene	0.957	0.867	0.010	9.4	50.0
112 1,2-Dibromo-3-chloropropane	0.049	0.041	0.010	15.6	50.0
113 1,2,4-Trichlorobenzene	0.501	0.474	0.010	5.3	50.0
114 Hexachlorobutadiene	0.460	0.482	0.010	-4.8	50.0
115 Napthalene	0.581	0.541	0.010	6.9	50.0
116 1,2,3-Trichlorobenzene	0.375	0.358	0.010	4.8	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: R2.i
Lab File ID: rr2754.d
Analysis Type: WATER

Injection Date: 01-JUL-2005 08:36
Lab Sample ID: SUPP010
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D	
122	dichlorotetrafluoroethane	10.0000	9.8358	1.6	50.0	
110	Ethylene Oxide	1250.0000	1300.0314	4.0	50.0	
87	Dichlorofluoromethane	10.0000	11.2312	12.3	50.0	
129	1,2-dichloro-1,1,2-trifluoroeth	10.0000	10.1806	1.8	50.0	
77	Ethyl Ether	10.0000	8.6944	13.1	50.0	
130	2,2-dichloro-1,1,1-trifluoroeth	10.0000	9.9954	0.0	50.0	
65	Trichlorotrifluoroethane	10.0000	10.3607	3.6	50.0	
131	2-Propanol	200.0000	164.4423	17.8	50.0	
124	Methyl acetate	50.0000	44.6584	10.7	50.0	
10	Carbon Disulfide	10.0000	9.8177	1.8	50.0	
67	Allyl Chloride	10.0000	9.9620	0.4	50.0	
53	Methyl t-butyl ether	10.0000	9.5231	4.8	50.0	
54	Hexane	10.0000	9.8917	1.1	50.0	
24	Vinyl acetate	20.0000	20.1149	0.6	50.0	
125	ETBE	50.0000	44.6635	10.7	50.0	
78	Ethyl Acetate	20.0000	17.9713	10.1	50.0	
56	Tetrahydrofuran	20.0000	17.3908	13.0	50.0	
89	Dibromofluoromethane	10.0000	14.7875	47.9	50.0	
115	Cyclohexane	10.0000	9.3509	6.5	50.0	
303	1,2-Dichloroethane-d4	10.0000	13.8480	38.5	50.0	
126	TAME	50.0000	43.6414	12.7	50.0	
116	2-Pentanone	40.0000	34.8657	12.8	50.0	
73	Methyl Methacrylate	20.0000	17.4617	12.7	50.0	
127	Methyl cyclohexane	10.0000	9.4477	5.5	50.0	
82	2-nitropropane	10.0000	8.1134	18.9	50.0	
35	2-Chloroethyl vinyl ether	10.0000	9.1832	8.2	50.0	
301	Toluene-d8	10.0000	15.0928	50.9	50.0	<-
41	Ethyl methacrylate	20.0000	16.2945	18.5	50.0	
128	Tetrahydrothiophene	10.0000	8.8642	11.4	50.0	
117	c-1,4-Dichloro-2-butene	10.0000	8.9080	10.9	50.0	
302	Bromofluorobenzene	10.0000	14.4529	44.5	50.0	
60	t-1,4-Dichloro-2-butene	10.0000	10.9061	9.1	50.0	
123	1,2,3-Trimethylbenzene	10.0000	10.3922	3.9	50.0	

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: R2.i
Lab File ID: rr2754.d
Analysis Type: WATER
Lab Sample ID: SUPP010
Quant Type: ISTD

Injection Date: 01-JUL-2005 08:36
Init. Calibration Date(s): 06/29/5 06/30/5
Init. Calibration Times: 21:50 01:24
Method File: /chem/R2.i/070105.b/R2-20ml-h2o.m

	COMPOUND	RRF	RF10	MIN RRF	%D	MAX %D	
$	46 Dibromofluoromethane	0.279	0.413	0.010	-47.9	50.0	
$	52 1,2-Dichloroethane-d4	0.276	0.382	0.010	-38.5	50.0	
$	70 Toluene-d8	3.075	4.641	0.010	-50.9	50.0	<-
$	93 Bromofluorobenzene	1.158	1.674	0.010	-44.5	50.0	
	4 dichlorotetrafluoroethane	0.207	0.204	0.010	1.6	50.0	
	7 Ethylene Oxide	0.003	0.003	0.001	-4.0	50.0	
	10 Dichlorofluoromethane	0.574	0.644	0.010	-12.3	50.0	
	13 1,2-dichloro-1,1,2-trifluor	0.197	0.200	0.010	-1.8	50.0	
	14 Ethyl Ether	0.093	0.081	0.010	13.1	50.0	
	15 2,2-dichloro-1,1,1-trifluor	0.374	0.374	0.010	0.0	50.0	
	17 Trichlorotrifluoroethane	0.178	0.184	0.010	-3.6	50.0	
	20 2-Propanol	0.006	0.005	0.001	N/A	N/A	
	23 Methyl acetate	0.069	0.062	0.010	10.7	50.0	
	24 Carbon Disulfide	0.937	0.920	0.010	1.8	50.0	
	25 Allyl Chloride	0.439	0.438	0.010	0.4	50.0	
	29 Methyl t-butyl ether	0.311	0.296	0.010	4.8	50.0	
	31 Hexane	0.327	0.324	0.010	1.1	50.0	
	32 Vinyl acetate	0.251	0.264	0.010	N/A	N/A	
	36 ETBE	0.544	0.486	0.010	10.7	50.0	
	38 Ethyl Acetate	0.094	0.084	0.010	10.1	50.0	
	45 Tetrahydrofuran	0.019	0.016	0.003	13.0	50.0	
	49 Cyclohexane	0.369	0.345	0.010	6.5	50.0	
	55 TAME	0.343	0.299	0.010	12.7	50.0	
	59 2-Pentanone	0.067	0.059	0.001	12.8	50.0	
	60 Methyl Methacrylate	0.011	0.010	0.008	12.7	50.0	
	62 Methyl cyclohexane	0.383	0.362	0.010	5.5	50.0	
	66 2-nitropropane	0.187	0.151	0.010	18.9	50.0	
	67 2-Chloroethyl vinyl ether	0.222	0.132	0.001	N/A	N/A	
	73 Ethyl methacrylate	0.526	0.428	0.010	18.5	50.0	
	79 Tetrahydrothiophene	0.064	0.057	0.010	11.4	50.0	
	91 c-1,4-Dichloro-2-butene	0.125	0.112	0.010	10.9	50.0	
	95 t-1,4-Dichloro-2-butene	0.089	0.097	0.010	-9.1	50.0	
	109 1,2,3-Trimethylbenzene	1.862	1.935	0.010	-3.9	50.0	

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5186179 SAS No.: 8260B SDG No.: D5F250124

Lab File ID (Standard): RR2754 Date Analyzed: 07/01/05

Instrument ID: R2 Time Analyzed: 0836

GC Column: HP624 ID: 0.32 (mm) Heated Purge: (Y/N) N

		IS1(CBZ) AREA #	RT #	IS2 AREA #	RT #	IS3(DCB) AREA #	RT #
	12 HOUR STD	177168	8.76	964832	6.07	215905	10.95
	UPPER LIMIT	354336	9.26	1929664	6.57	431810	11.45
	LOWER LIMIT	88584	8.26	482416	5.57	107952	10.45
	EPA SAMPLE NO.						
01	LCS	174184	8.76	989906	6.07	247626	10.95
02	VBLK	185406	8.76	998430	6.07	242295	10.94
03	TB-062405	179256	8.77	1047180	6.07	232293	10.94
04	FB-062405	185191	8.76	1061871	6.07	252605	10.95
05	BH-9E-1216	189824	8.76	1017093	6.07	234838	10.95
06	BH-E-1216	196403	8.76	1100594	6.07	268168	10.95
07	BH-E-1216	206180	8.77	1195961	6.07	272876	10.94
08	BH-E-1216	200189	8.76	1190289	6.08	268852	10.95
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (CBZ) = Chlorobenzene-d5
IS2 = Fluorobenzene
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

8A
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5186179 SAS No.: 8260B SDG No.: D5F250124

Lab File ID (Standard): RR2698 Date Analyzed: 06/30/05

Instrument ID: R2 Time Analyzed: 0045

GC Column: HP624 ID: 0.32 (mm) Heated Purge: (Y/N) N

		IS1(CBZ) AREA #	RT #	IS2 AREA #	RT #	IS3(DCB) AREA #	RT #
	12 HOUR STD	175964	8.75	1050691	6.07	234441	10.94
	UPPER LIMIT	351928	9.25	2101382	6.57	468882	11.44
	LOWER LIMIT	87982	8.25	525346	5.57	117220	10.44
	EPA SAMPLE NO.						
01	ICV030	211908	8.76	1104328	6.06	279911	10.94
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (CBZ) = Chlorobenzene-d5
IS2 = Fluorobenzene
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

Volatile GC/MS

CLP-Like Forms

Lot ID: D5F250124

Client: Ashland Chemical Company

Method: SW846 8260B

Associated Samples: 005, 006, 009 through 013

Batch: 5181482

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-B-0102
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-005
Matrix:	SOLID	**Lab WorkOrder:**	HED691AC
% Moisture:	13	**Date/Time Collected:**	06/24/05 10:10
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 18:12
Sample Aliquot:	6.06 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	**0.20**	0.20	5.8	J

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	118	32	133	
2037-26-5	Toluene-d8	97	25	145	
1868-53-7	Dibromofluoromethane	104	43	131	
460-00-4	4-Bromofluorobenzene	89	29	148	

U Result is less than the method detection limit (MDL).

J Estimated result. Result is less than RL.

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-B-0506
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-006
Matrix:	SOLID	**Lab WorkOrder:**	HED7A1AC
% Moisture:	18	**Date/Time Collected:**	06/24/05 10:18
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 18:33
Sample Aliquot:	6.2 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	0.21	0.21	6.1	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	110	32	133	
2037-26-5	Toluene-d8	98	25	145	
1868-53-7	Dibromofluoromethane	99	43	131	
460-00-4	4-Bromofluorobenzene	93	29	148	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-A-0102
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-009
Matrix:	SOLID	**Lab WorkOrder:**	HED7F1AC
% Moisture:	12	**Date/Time Collected:**	06/24/05 11:36
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 18:54
Sample Aliquot:	6.42 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	**0.28**	0.19	5.7	J

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	112	32	133	
2037-26-5	Toluene-d8	95	25	145	
1868-53-7	Dibromofluoromethane	101	43	131	
460-00-4	4-Bromofluorobenzene	86	29	148	

U Result is less than the method detection limit (MDL).

J Estimated result. Result is less than RL.

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-A-0506
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-010
Matrix:	SOLID	**Lab WorkOrder:**	HED7H1AC
% Moisture:	14	**Date/Time Collected:**	06/24/05 11:40
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 19:16
Sample Aliquot:	6.09 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	0.20	0.20	5.8	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	119	32	133	
2037-26-5	Toluene-d8	89	25	145	
1868-53-7	Dibromofluoromethane	100	43	131	
460-00-4	4-Bromofluorobenzene	86	29	148	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-9A-0506
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-011
Matrix:	SOLID	**Lab WorkOrder:**	HED7K1AC
% Moisture:	14	**Date/Time Collected:**	06/24/05 12:00
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 19:37
Sample Aliquot:	5.96 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	0.20	0.20	5.8	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	119	32	133	
2037-26-5	Toluene-d8	97	25	145	
1868-53-7	Dibromofluoromethane	104	43	131	
460-00-4	4-Bromofluorobenzene	93	29	148	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company
Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	AC-BH002-0405
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-012
Matrix:	SOLID	**Lab WorkOrder:**	HED7M1AC
% Moisture:	17	**Date/Time Collected:**	06/24/05 12:36
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 19:58
Sample Aliquot:	5.97 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	0.21	0.21	6.0	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	108	32	133	
2037-26-5	Toluene-d8	95	25	145	
1868-53-7	Dibromofluoromethane	95	43	131	
460-00-4	4-Bromofluorobenzene	95	29	148	

U Result is less than the method detection limit (MDL).

Form 1 Analysis Data Sheet Equivalent

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	AC-BH002-0708
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-013
Matrix:	SOLID	**Lab WorkOrder:**	HED7P1AC
% Moisture:	19	**Date/Time Collected:**	06/24/05 12:40
Basis:	Dry	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 20:19
Sample Aliquot:	6.23 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	0.21	0.21	6.1	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	106	32	133	
2037-26-5	Toluene-d8	96	25	145	
1868-53-7	Dibromofluoromethane	99	43	131	
460-00-4	4-Bromofluorobenzene	96	29	148	

U Result is less than the method detection limit (MDL).

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXA4BQK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	BH-D-1112	108	102	98	110	00
02	BH-C-1112	102	93	92	109	00
03	METHOD BLK. HEX3M1AA	98	90	85	92	00
04	LCS HEX3M1AC	119	112	106	117	00
05	LCSD HEX3M1AD	109	101	104	111	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(71-126)
SRG02	= 1,2-Dichloroethane-d4	(61-129)
SRG03	= Toluene-d8	(68-128)
SRG04	= 4-Bromofluorobenzene	(80-128)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXA4DQK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	BH-B-0102	104	118	97	89	00
02	BH-B-0506	99	110	98	93	00
03	BH-A-0102	101	112	95	86	00
04	BH-A-0506	100	119	89	86	00
05	BH-9A-0506	104	119	97	93	00
06	AC-BH002-0405	95	108	95	95	00
07	AC-BH002-0708	99	106	96	96	00
08	METHOD BLK. HEP4F1AA	104	111	102	88	00
09	LCS HEP4F1AC	99	107	100	91	00
10	LCSD HEP4F1AD	100	103	97	86	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(71-126)
SRG02	= 1,2-Dichloroethane-d4	(61-129)
SRG03	= Toluene-d8	(68-128)
SRG04	= 4-Bromofluorobenzene	(80-128)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SW846 8260B SURROGATE RECOVERY

Lab Name: Severn Trent Laboratories, Inc. Client: Ashland Chemical Company

Lab Code: STLDEN SDG No:

Lot #: D5F250124

Extraction: XXI25QK01

	CLIENT ID.	SRG01	SRG02	SRG03	SRG04	TOT OUT
01	TB-062405	93	88	100	89	00
02	FB-062405	90	90	94	93	00
03	BH-9E-1216	100	88	94	92	00
04	BH-E-1216	96	88	105	100	00
05	METHOD BLK. HEV4K1AA	100	90	103	92	00
06	LCS HEV4K1AC	100	97	111	102	00
07	BH-E-1216 D	92	85	100	96	00
08	BH-E-1216 S	93	89	105	96	00

SURROGATES		QC LIMITS
SRG01	= Dibromofluoromethane	(73-118)
SRG02	= 1,2-Dichloroethane-d4	(62-128)
SRG03	= Toluene-d8	(77-117)
SRG04	= 4-Bromofluorobenzene	(78-118)

\# Column to be used to flag recovery values
* Values outside of required QC Limits
D System monitoring Compound diluted out

FORM II

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F300000-482C
Matrix:	SOLID	**Lab WorkOrder:**	HEP4F1AC
% Moisture:	0.0	**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 09:46
Sample Aliquot:	5 g	**Instrument ID:**	G
Dilution Factor:	1		

Analyte	True	Found	%Rec	Q	Limits
Benzene	50.0	51.5	103		78 - 130
Toluene	50.0	51.2	102		76 - 126
Trichloroethene	50.0	50.5	101		80 - 127
Chlorobenzene	50.0	52.3	105		79 - 120
1,1-Dichloroethene	50.0	47.9	96		54 - 124

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	107	61	129	
2037-26-5	Toluene-d8	100	68	128	
1868-53-7	Dibromofluoromethane	99	71	126	
460-00-4	4-Bromofluorobenzene	91	80	128	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F300000-482L
Matrix:	SOLID	**Lab WorkOrder:**	HEP4F1AD
% Moisture:	0.0	**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 16:26
Sample Aliquot:	5 g	**Instrument ID:**	G
Dilution Factor:	1		

Analyte	True	Found	C	% Rec	Q	RPD	Q	QC Limits	
								% Rec	RPD
Benzene	50.0	45.3		91		13		78 - 130	20
Toluene	50.0	49.9		100		2.7		76 - 126	20
Trichloroethene	50.0	45.9		92		9.4		80 - 127	20
Chlorobenzene	50.0	50.3		101		4.0		79 - 120	20
1,1-Dichloroethene	50.0	40.8		82		16		54 - 124	22

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	103	61	129	
2037-26-5	Toluene-d8	97	68	128	
1868-53-7	Dibromofluoromethane	100	71	126	
460-00-4	4-Bromofluorobenzene	86	80	128	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F300000-482B
Matrix:	SOLID	**Lab WorkOrder:**	HEP4F1AA
% Moisture:		**Date/Time Collected:**	
Basis:	Wet	**Date/Time Received:**	
Analysis Method:	8260B	**Date/Time Leached:**	
Unit:	ug/kg	**Date/Time Extracted:**	06/25/05 10:00
QC Batch ID:	5181482	**Date/Time Analyzed:**	06/29/05 17:51
Sample Aliquot:	5 g	**Instrument ID:**	G
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
127-18-4	Tetrachloroethene	0.17	0.17	5.0	U

CAS No.	Surrogate	% Rec	Lower Limit	Upper Limit	Q
17060-07-0	1,2-Dichloroethane-d4	111	32	133	
2037-26-5	Toluene-d8	102	25	145	
1868-53-7	Dibromofluoromethane	104	43	131	
460-00-4	4-Bromofluorobenzene	88	29	148	

U Result is less than the method detection limit (MDL).

SW846 8260B METHOD BLANK SUMMARY

BLANK WORKORDER NO.: HEP4F1AA

Lab Name: Severn Trent Laboratories, Inc.

Lab Code: STLDEN SDG Number:

Lab File ID: G3292.D Lot Number: D5F250124

Date Analyzed: 06/29/05 Time Analyzed: 17:51

Matrix: SOLID Date Extracted:06/25/05

GC Column: DB-624 ID: .32 Extraction Method: 5035

Instrument ID: G Level:(low/med) LOW

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, LCS, LCSD, MS , MSD:

	CLIENT ID.	SAMPLE WORK ORDER #	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	BH-B-0102	HED691AC	G3293.D	06/29/05	18:12
02	BH-B-0506	HED7A1AC	G3294.D	06/29/05	18:33
03	BH-A-0102	HED7F1AC	G3295.D	06/29/05	18:54
04	BH-A-0506	HED7H1AC	G3296.D	06/29/05	19:16
05	BH-9A-0506	HED7K1AC	G3297.D	06/29/05	19:37
06	AC-BH002-0405	HED7M1AC	G3298.D	06/29/05	19:58
07	AC-BH002-0708	HED7P1AC	G3299.D	06/29/05	20:19
08	CHECK SAMPLE	HEP4F1AC C	G3270.D	06/29/05	09:46
09	DUPLICATE CHECK	HEP4F1AD L	G3288.D	06/29/05	16:26
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COMMENTS:

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5181482 SAS No.: 8260B SDG No.: D5F250124

Lab File ID: G2695 BFB Injection Date: 06/09/05

Instrument ID: G BFB Injection Time: 1413

GC Column: HP624 ID: 0.32 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	19.1
75	30.0 - 60.0% of mass 95	45.7
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.6
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	80.6
175	5.0 - 9.0% of mass 174	6.9 (8.6)1
176	95.0 - 101.0% of mass 174	76.9 (95.4)1
177	5.0 - 9.0% of mass 176	6.5 (8.5)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SUPP005	SUPP005	G2703	06/09/05	1652
02	SUPP010	SUPP010	G2704	06/09/05	1713
03	SUPP020	SUPP020	G2705	06/09/05	1734
04	SUPP050	SUPP050	G2706	06/09/05	1755
05	SUPP100	SUPP100	G2707	06/09/05	1817
06	SUPP200	SUPP200	G2708	06/09/05	1838
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FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5181482 SAS No.: 8260B SDG No.: D5F250124

Lab File ID: G3230 BFB Injection Date: 06/28/05

Instrument ID: G BFB Injection Time: 1413

GC Column: HP624 ID: 0.32 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE	
50	15.0 - 40.0% of mass 95	20.9	
75	30.0 - 60.0% of mass 95	47.6	
95	Base Peak, 100% relative abundance	100.0	
96	5.0 - 9.0% of mass 95	7.3	
173	Less than 2.0% of mass 174	0.6	(0.8)1
174	50.0 - 100.0% of mass 95	77.4	
175	5.0 - 9.0% of mass 174	6.3	(8.1)1
176	95.0 - 101.0% of mass 174	75.0	(96.8)1
177	5.0 - 9.0% of mass 176	4.7	(6.3)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	MAIN005	MAIN005	G3232	06/28/05	1448
02	MAIN010	MAIN010	G3233	06/28/05	1510
03	MAIN020	MAIN020	G3234	06/28/05	1531
04	MAIN050	MAIN050	G3235	06/28/05	1552
05	MAIN100	MAIN100	G3236	06/28/05	1614
06	MAIN200	MAIN200	G3237	06/28/05	1635
07	ICV	MAIN050	G3239I	06/28/05	1718
08					
09					
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FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5181482 SAS No.: 8260B SDG No.: D5F250124

Lab File ID: G3267 BFB Injection Date: 06/29/05

Instrument ID: G BFB Injection Time: 0829

GC Column: HP624 ID: 0.32 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	25.3
75	30.0 - 60.0% of mass 95	46.8
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	8.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	50.0 - 100.0% of mass 95	62.3
175	5.0 - 9.0% of mass 174	4.4 (7.1)1
176	95.0 - 101.0% of mass 174	62.9 (100.9)1
177	5.0 - 9.0% of mass 176	4.1 (6.5)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	MAIN050	MAIN050	G3268	06/29/05	0845
02	SUPP050	SUPP050	G3269	06/29/05	0925
03	LCS	LCS	G3270	06/29/05	0946
04	LCSD	LCSD	G3288	06/29/05	1626
05	PBLK	PBLK	G3292	06/29/05	1751
06	BH-B-1112	HED691AC	G3293	06/29/05	1812
07	BH-B-0506	HED7A1AC	G3294	06/29/05	1833
08	BH-A-0102	HED7F1AC	G3295	06/29/05	1854
09	BH-A-0506	HED7H1AC	G3296	06/29/05	1916
10	BH-9A-0506	HED7K1AC	G3297	06/29/05	1937
11	AC-BH002-040	HED7M1AC	G3298	06/29/05	1958
12	AC-BH002-070	HED7P1AC	G3299	06/29/05	2019
13					
14					
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21					
22					

Report Date : 30-Jun-2005 17:02

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

Calibration File Names:
Level 1: /chem/G.i/060905i.b/g2703.d
Level 2: /chem/G.i/060905i.b/g2704.d
Level 3: /chem/G.i/060905i.b/g2705.d
Level 4: /chem/G.i/060905i.b/g2706.d
Level 5: /chem/G.i/060905i.b/g2707.d
Level 6: /chem/G.i/060905i.b/g2708.d

	Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
M	1 1,2-Dichloroethene (total)	0.52565	0.44146	0.50106	0.45816	0.44801	0.43373	AVRG		0.46801		7.87543
M	2 Xylene (total)	4.46447	4.32176	4.29873	4.26125	4.26512	4.17815	AVRG		4.29825		2.20893
	3 dichlorodifluoromethane	0.50943	0.42973	0.44582	0.40101	0.39785	0.38208	AVRG		0.42765		10.81535
	4 Dichlorotetrafluoroethane	0.39439	0.33816	0.32625	0.33209	0.32842	0.28641	AVRG		0.33429		10.38245
	5 Chloromethane	0.91771	0.75555	0.77239	0.69053	0.67253	0.64644	AVRG		0.74252		13.27581
	6 Vinyl Chloride	0.82354	0.70430	0.72240	0.67311	0.64177	0.61397	AVRG		0.69651		10.59414
	7 Ethylene Oxide	0.02259	0.02022	0.02152	0.02245	0.02338	0.01960	AVRG		0.02163		6.79391
	8 Bromomethane	0.48934	0.40888	0.41644	0.39801	0.41372	0.46780	AVRG		0.43236		8.55145
	9 Chloroethane	0.39520	0.33240	0.34547	0.31242	0.30899	0.31481	AVRG		0.33488		9.75372

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
10 Dichlorofluoromethane	1.26789	1.11374	1.13231	1.17820	1.21448	1.08909	AVRG		1.16595		5.77397
11 Trichlorofluoromethane	0.69484	0.62507	0.64116	0.58377	0.56618	0.56836	AVRG		0.61323		8.21093
12 Ethanol	+++++	0.00674	0.00855	0.00810	0.00820	0.00927	AVRG		0.00817		11.27268
126 1,2-dichloro-1,1,2-trifluoroe	0.61601	0.54825	0.57251	0.57422	0.56990	0.50672	AVRG		0.56460		6.35789
13 Ethyl Ether	0.51681	0.45017	0.47165	0.48847	0.48302	0.44849	AVRG		0.47643		5.40233
127 2,2-dichloro-1,1,1-trifluoroe	0.93618	0.79145	0.82177	0.83812	0.84254	0.74595	AVRG		0.82934		7.64760
14 Acrolein	0.13641	0.11988	0.13324	0.12523	0.12293	0.13283	AVRG		0.12842		5.16161
15 Acetone	0.27193	0.21428	0.21186	0.20008	0.19118	0.20099	AVRG		0.21505		13.53703
16 Trichlorotrifluoroethane	0.49715	0.42332	0.43886	0.44074	0.43709	0.39212	AVRG		0.43821		7.79121
17 1,1-Dichloroethene	0.55186	0.47672	0.49110	0.44566	0.44651	0.44175	AVRG		0.47560		8.89359
128 2-Propanol	0.03726	0.03483	0.03688	0.03878	0.04027	0.03756	AVRG		0.03760		4.87770
18 Iodomethane	1.08078	0.95589	1.01562	0.94392	0.96084	0.97237	AVRG		0.98823		5.22421
19 Acetonitrile	0.05880	0.05237	0.06294	0.06785	0.06991	0.07223	AVRG		0.06402		11.71154
20 Methyl Acetate	0.40959	0.36864	0.40639	0.40388	0.40292	0.37149	AVRG		0.39382		4.71436
21 Allyl Chloride	0.82015	0.69918	0.69019	0.70479	0.71847	0.63083	AVRG		0.71060		8.67648
22 Carbon Disulfide	2.14004	1.86470	1.89806	1.89560	1.88914	1.66744	AVRG		1.89250		7.93498
23 tert-Butyl alcohol	0.07491	0.06038	0.06781	0.06857	0.06709	0.07245	AVRG		0.06854		7.29673

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
24 Methylene Chloride	130909	227528	410631	1018342	2115008	4321146	WLINR	-0.05062	0.57114		0.99858
25 Acrylonitrile	0.22777	0.21059	0.23188	0.22027	0.21497	0.21732	AVRG		0.22047		3.63599
26 Methyl t-butyl ether	1.04989	0.97562	0.97328	0.99602	1.00176	0.94761	AVRG		0.99070		3.50880
27 trans-1,2-Dichloroethene	0.54945	0.47137	0.52978	0.48505	0.47753	0.46168	AVRG		0.49581		7.12668
28 Hexane	1.99736	1.67015	1.84129	1.72007	1.76865	1.70708	AVRG		1.78410		6.72646
29 Vinyl acetate	0.82122	0.75142	0.75878	0.76766	0.74163	0.66547	AVRG		0.75103		6.70335
30 Isopropyl ether	0.33315	0.30031	0.32703	0.28804	0.28183	0.27570	AVRG		0.30101		7.98310
31 1,1-Dichloroethane	0.96208	0.85131	0.88619	0.78090	0.78336	0.76329	AVRG		0.83785		9.20200
32 Chloroprene	0.48305	0.42828	0.45359	0.42876	0.42140	0.41433	AVRG		0.43824		5.85171
33 ETBE	0.93547	0.85675	0.87052	0.88050	0.86428	0.59911	AVRG		0.83444		14.21998
34 2-Butanone	0.27308	0.22312	0.24633	0.22693	0.21946	0.23140	AVRG		0.23672		8.49507
35 Ethyl Acetate	0.36877	0.32335	0.33448	0.32716	0.34391	0.31615	AVRG		0.33564		5.60560
36 Propionitrile	0.06441	0.05313	0.06343	0.05980	0.05784	0.05906	AVRG		0.05961		6.83633
37 cis-1,2-Dichloroethene	0.50186	0.41154	0.47234	0.43127	0.41849	0.40577	AVRG		0.44021		8.73484
38 2,2-Dichloropropane	0.49880	0.41312	0.45287	0.40060	0.40256	0.38494	AVRG		0.42548		10.00816
39 Methacrylonitrile	0.29225	0.25226	0.27845	0.26228	0.24646	0.19699	AVRG		0.25478		12.94177
40 Bromochloromethane	0.30882	0.27678	0.29554	0.27055	0.26398	0.25684	AVRG		0.27875		7.09419

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
41 Chloroform	0.79125	0.73165	0.76467	0.67526	0.65734	0.63857	AVRG		0.70979		8.71698
42 Tetrahydrofuran	0.08374	0.07303	0.07659	0.07695	0.07700	0.07371	AVRG		0.07684		4.94202
44 1,1,1-Trichloroethane	0.49521	0.46305	0.48708	0.44350	0.43745	0.42999	AVRG		0.45938		5.89110
45 Isobutanol	0.01672	0.01426	0.01596	0.01486	0.01433	0.01543	AVRG		0.01526		6.33891
46 Cyclohexane	0.49424	0.44712	0.44797	0.43485	0.44442	0.39941	AVRG		0.44467		6.83540
47 1,1-Dichloropropene	0.49341	0.46660	0.49555	0.45826	0.44561	0.42981	AVRG		0.46487		5.61168
48 Carbon Tetrachloride	0.51398	0.47745	0.49290	0.45926	0.44854	0.44539	AVRG		0.47292		5.70894
50 1,2-Dichloroethane	0.60292	0.52056	0.53628	0.49615	0.49213	0.47338	AVRG		0.52024		8.87558
51 Benzene	1.42158	1.26166	1.32279	1.21591	1.23215	1.15462	AVRG		1.26812		7.35387
52 TAME	0.68964	0.63960	0.65359	0.68142	0.66962	0.52287	AVRG		0.64279		9.56870
54 n-Butanol	0.01211	0.01021	0.01031	0.01123	0.01145	0.01274	AVRG		0.01134		8.73226
55 Trichloroethene	0.43386	0.40521	0.40362	0.35479	0.39464	0.36888	AVRG		0.39350		7.16481
56 2-Pentanone	0.24890	0.22349	0.24186	0.24399	0.25012	0.23363	AVRG		0.24033		4.21748
57 Methyl Methacrylate	0.07333	0.06987	0.07317	0.08000	0.07655	0.07212	AVRG		0.07417		4.82696
58 1,2-Dichloropropane	0.44436	0.38818	0.40741	0.36735	0.37581	0.36360	AVRG		0.39112		7.80980
59 Methyl Cyclohexane	0.46814	0.38486	0.39529	0.38574	0.37661	0.31584	AVRG		0.38775		12.54310
60 1,4-Dioxane	0.00459	0.00388	0.00449	0.00447	0.00446	0.00459	AVRG		0.00441		6.03952

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
61 Dibromomethane	0.43249	0.34973	0.37319	0.32741	0.32153	0.32253	AVRG		0.35448		12.16492
62 Bromodichloromethane	0.58143	0.52079	0.55848	0.51037	0.49965	0.50989	AVRG		0.53010		6.11394
63 2-nitropropane	0.25281	0.20892	0.22852	0.22267	0.22718	0.23091	AVRG		0.22850		6.23791
64 2-Chloroethyl vinyl ether	+++++	14042	30456	94222	222474	539125	WLINR	0.12943	0.09936		0.99314
65 cis-1,3-Dichloropropene	0.56117	0.54020	0.58183	0.56148	0.58503	0.57615	AVRG		0.56764		2.95686
66 4-Methyl-2-pentanone	1.64606	1.53656	1.57221	1.65174	1.59795	1.50886	AVRG		1.58556		3.64006
68 Toluene	5.24941	4.85081	4.84249	4.92015	4.69972	4.74179	AVRG		4.88406		4.01056
69 trans-1,3-Dichloropropene	1.81423	1.83551	1.80985	1.93032	1.91570	1.94319	AVRG		1.87480		3.27627
70 Ethyl methacrylate	1.22879	1.17995	1.35557	1.30098	1.36542	1.38726	AVRG		1.30299		6.36676
71 1,1,2-Trichloroethane	1.48055	1.38140	1.33073	1.32762	1.32986	1.31400	AVRG		1.36069		4.63837
72 2-Hexanone	1.07263	1.07271	1.15136	1.22716	1.22529	1.27121	AVRG		1.17006		7.23804
73 1,3-Dichloropropane	2.36180	2.22385	2.20718	2.07294	2.07124	2.08118	AVRG		2.16970		5.38008
74 Tetrachloroethene	1.37766	1.20041	1.21114	1.18520	1.15929	1.13073	AVRG		1.21074		7.16903
75 Dibromochloromethane	1.96908	1.83259	1.85463	1.94839	1.92605	1.99792	AVRG		1.92144		3.39086
76 Tetrahydrothiophene	0.60265	0.60763	0.59588	0.56527	0.61845	0.64834	AVRG		0.60637		4.49961
77 1,2-Dibromoethane	1.81349	1.70246	1.70865	1.75866	1.77670	1.82059	AVRG		1.76342		2.85692
78 1-Chlorohexane	1.76039	1.81770	1.81487	1.99501	1.96180	1.98067	AVRG		1.88841		5.40331

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
80 Chlorobenzene	4.29780	4.09505	3.88075	3.77644	3.93739	3.85922	AVRG		3.97444		4.79696
81 1,1,1,2-Tetrachloroethane	1.54997	1.44838	1.41936	1.43897	1.46809	1.45549	AVRG		1.46338		3.10769
82 Ethylbenzene	1.85980	1.78820	1.79064	1.79294	1.79032	1.75298	AVRG		1.79581		1.93736
83 m and p-Xylene	2.25978	2.26791	2.15882	2.30240	2.26916	2.24554	AVRG		2.25060		2.16412
84 o-Xylene	2.22853	2.31566	2.22537	2.28198	2.39120	2.32519	AVRG		2.29466		2.75819
85 Styrene	3.19616	3.64218	3.60408	3.87885	4.11013	4.12499	AVRG		3.75940		9.41232
86 Bromoform	1.40897	1.36682	1.37179	1.46093	1.46948	1.57472	AVRG		1.44212		5.40696
87 isopropyl benzene	5.29405	5.44597	5.44863	5.82778	5.82499	5.88408	AVRG		5.62091		4.50649
88 cis-1,4-Dichloro-2-butene	0.32935	0.32736	0.33952	0.36054	0.36403	0.37309	AVRG		0.34898		5.56245
89 Cyclohexanone	0.08525	0.07637	0.08387	0.08992	0.09074	0.09371	AVRG		0.08664		7.16454
91 1,1,2,2-Tetrachloroethane	1.75104	1.48619	1.52262	1.49695	1.40902	1.44054	AVRG		1.51773		7.99714
92 t-1,4-Dichloro-2-butene	0.17194	0.15079	0.17002	0.17532	0.17573	0.18768	AVRG		0.17191		7.00293
93 1,2,3-Trichloropropane	0.41119	0.34002	0.35267	0.33377	0.32435	0.33504	AVRG		0.34951		9.04324
94 Bromobenzene	1.29427	1.21231	1.21463	1.17136	1.19355	1.22350	AVRG		1.21827		3.41683
95 n-Propylbenzene	1.00619	0.96364	1.00098	0.96769	0.99844	1.00359	AVRG		0.99009		1.93309
96 2-Chlorotoluene	1.06808	1.00215	1.01484	1.00784	0.96685	1.00134	AVRG		1.01019		3.25318
97 1,3,5-Trimethylbenzene	3.10889	2.87364	3.01930	3.10707	2.98980	3.04761	AVRG		3.02439		2.90011

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

	Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
98	4-Chlorotoluene	1.04084	0.91240	1.00909	1.03542	0.98091	1.03132	AVRG		1.00166		4.89236
99	tert-Butylbenzene	2.71261	2.46236	2.52256	2.69044	2.92153	2.88032	AVRG		2.69830		6.82919
100	1,2,4-Trimethylbenzene	2.98984	2.92482	3.15625	3.18523	3.20593	3.07942	AVRG		3.09025		3.67037
101	sec-Butylbenzene	3.85715	3.79966	3.98635	4.14163	4.09268	3.91587	AVRG		3.96556		3.37075
102	4-Isopropyltoluene	3.04430	3.03038	3.21918	3.43654	3.34562	3.33577	AVRG		3.23530		5.19971
103	m-Dichlorobenzene	2.21189	2.02462	1.97834	2.04930	2.03279	1.99661	AVRG		2.04893		4.09092
105	p-dichlorobenzene	2.23820	2.19746	2.12387	2.13563	2.07803	2.05333	AVRG		2.13775		3.27755
106	1,2,3-Trimethylbenzene	3.06858	2.81877	2.82341	2.83752	2.90074	2.87664	AVRG		2.88761		3.26376
107	n-Butylbenzene	3.24442	3.15377	3.28196	3.54966	3.46876	3.31770	AVRG		3.33605		4.40806
108	o-Dichlorobenzene	2.12589	1.97439	1.96235	2.03030	1.96144	1.89917	AVRG		1.99226		3.89671
109	1,2-Dibromo-3-chloropropane	0.33107	0.29134	0.29813	0.30702	0.30060	0.30890	AVRG		0.30618		4.48815
110	1,2,4-Trichlorobenzene	1.28977	1.20074	1.18181	1.32325	1.31951	1.29958	AVRG		1.26911		4.87292
111	Hexachlorobutadiene	0.80086	0.73518	0.66039	0.73415	0.70981	0.66917	AVRG		0.71826		7.15085
112	Napthalene	2.73656	2.50949	2.62692	3.04657	3.06151	2.96823	AVRG		2.82488		8.25885
113	1,2,3-Trichlorobenzene	1.21816	1.17368	1.15629	1.25659	1.23292	1.20238	AVRG		1.20667		3.09146
$ 43	Dibromofluoromethane	0.49172	0.51042	0.48976	0.49504	0.49368	0.45348	AVRG		0.48902		3.86600

STL Denver

INITIAL CALIBRATION DATA

Start Cal Date : 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35
Quant Method : ISTD
Target Version : 3.40
Integrator : HP RTE
Method file : /chem/G.i/062905.b/G5030-8260B-soil.m
Cal Date : 29-Jun-2005 10:06 appelhad

Compound	5 Level 1	10 Level 2	20 Level 3	50 Level 4	100 Level 5	200 Level 6	Curve	Coefficients b	m1	m2	%RSD or R^2
$ 49 1,2-Dichloroethane-d4	0.35941	0.37483	0.36730	0.36848	0.37903	0.32848	AVRG		0.36292		5.00515
$ 67 Toluene-d8	3.95266	4.12390	3.98778	3.99318	4.11753	3.92783	AVRG		4.01714		2.08406
$ 90 Bromofluorobenzene	1.86363	1.93688	1.86247	1.87155	1.96872	1.87297	AVRG		1.89603		2.38914

Curve	Formula	Units
Averaged	Amt = Rsp/m1	Response
Wt Linear	Amt = b + Rsp/m1	Response

INITIAL CALIBRATION VERIFICATION

Instrument ID: G.i
Lab File ID: g3239i.d
Analysis Type: SOIL

Injection Date: 28-JUN-2005 17:18
Lab Sample ID: MAIN050
Method File: /chem/G.i/062805i.b/G5030-8260B-soil.

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
85	1,2-Dichloroethene (total)	100.0000	96.9617	3.0	25.0
83	Xylene (total)	150.0000	140.3239	6.5	25.0
64	dichlorodifluoromethane	50.0000	48.6209	2.8	25.0
1	Chloromethane	50.0000	43.5523	12.9	25.0
4	Vinyl Chloride	50.0000	47.5232	5.0	25.0
2	Bromomethane	50.0000	47.3806	5.2	25.0
5	Chloroethane	50.0000	46.7808	6.4	25.0
11	Trichlorofluoromethane	50.0000	48.2016	3.6	25.0
7	Acetone	100.0000	95.0535	4.9	25.0
12	1,1-Dichloroethene	50.0000	48.7158	2.6	25.0
6	Methylene Chloride	50.0000	51.2463	2.5	25.0
0	trans-1,2-Dichloroethene	50.0000	49.5430	0.9	25.0
15	1,1-Dichloroethane	50.0000	45.5334	8.9	25.0
20	2-Butanone	100.0000	96.7864	3.2	25.0
0	cis-1,2-Dichloroethene	50.0000	47.4187	5.2	25.0
93	2,2-Dichloropropane	50.0000	44.9644	10.1	25.0
13	Bromochloromethane	50.0000	45.7609	8.5	25.0
17	Chloroform	50.0000	45.1265	9.7	25.0
22	1,1,1-Trichloroethane	50.0000	45.8407	8.3	25.0
94	1,1-Dichloropropene	50.0000	45.0779	9.8	25.0
23	Carbon Tetrachloride	50.0000	45.7207	8.6	25.0
16	1,2-Dichloroethane	50.0000	44.9700	10.1	25.0
30	Benzene	50.0000	45.6919	8.6	25.0
90	Fluorobenzene	50.0000	50.0000	0.0	25.0
29	Trichloroethene	50.0000	46.7312	6.5	25.0
26	1,2-Dichloropropane	50.0000	47.4609	5.1	25.0
34	Dibromomethane	50.0000	44.7915	10.4	25.0
25	Bromodichloromethane	50.0000	46.4756	7.0	25.0
28	cis-1,3-Dichloropropene	50.0000	49.1312	1.7	25.0
38	4-Methyl-2-pentanone	100.0000	95.1029	4.9	25.0
45	Toluene	50.0000	45.7360	8.5	25.0
31	trans-1,3-Dichloropropene	50.0000	48.1060	3.8	25.0
32	1,1,2-Trichloroethane	50.0000	45.5573	8.9	25.0
43	2-Hexanone	100.0000	96.9863	3.0	25.0
109	1,3-Dichloropropane	50.0000	45.8582	8.3	25.0
42	Tetrachloroethene	50.0000	45.5506	8.9	25.0
36	Dibromochloromethane	50.0000	48.0259	3.9	25.0
58	1,2-Dibromoethane	50.0000	49.6120	0.8	25.0
92	1-Chlorohexane	50.0000	44.1747	11.7	25.0

INITIAL CALIBRATION VERIFICATION

Instrument ID: G.i
Lab File ID: g3239i.d
Analysis Type: SOIL

Injection Date: 28-JUN-2005 17:18
Lab Sample ID: MAIN050
Method File: /chem/G.i/062805i.b/G5030-8260B-soil.

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
39	Chlorobenzene-d5	50.0000	50.0000	0.0	25.0
46	Chlorobenzene	50.0000	48.0285	3.9	25.0
47	Ethylbenzene	50.0000	47.5816	4.8	25.0
74	1,1,1,2-Tetrachloroethane	50.0000	48.0684	3.9	25.0
0	m and p-Xylene	100.0000	90.8491	9.2	25.0
0	o-Xylene	50.0000	49.4748	1.1	25.0
49	Styrene	50.0000	51.0703	2.1	25.0
37	Bromoform	50.0000	49.8369	0.3	25.0
79	isopropyl benzene	50.0000	47.2918	5.4	25.0
40	1,1,2,2-Tetrachloroethane	50.0000	47.0539	5.9	25.0
50	1,2,3-Trichloropropane	50.0000	49.2155	1.6	25.0
95	Bromobenzene	50.0000	48.9571	2.1	25.0
96	n-Propylbenzene	50.0000	48.9500	2.1	25.0
97	2-Chlorotoluene	50.0000	49.4702	1.1	25.0
98	1,3,5-Trimethylbenzene	50.0000	49.7474	0.5	25.0
99	4-Chlorotoluene	50.0000	49.2768	1.4	25.0
100	tert-Butylbenzene	50.0000	47.5248	5.0	25.0
101	1,2,4-Trimethylbenzene	50.0000	48.8419	2.3	25.0
102	sec-Butylbenzene	50.0000	50.6981	1.4	25.0
103	4-Isopropyltoluene	50.0000	47.8669	4.3	25.0
61	m-Dichlorobenzene	50.0000	45.5126	9.0	25.0
91	1,4-Dichlorobenzene-d4	50.0000	50.0000	0.0	25.0
62	p-dichlorobenzene	50.0000	47.5783	4.8	25.0
104	n-Butylbenzene	50.0000	48.5649	2.9	25.0
63	o-Dichlorobenzene	50.0000	48.5831	2.8	25.0
75	1,2-Dibromo-3-chloropropane	50.0000	47.4801	5.0	25.0
105	1,2,4-Trichlorobenzene	50.0000	49.5931	0.8	25.0
106	Hexachlorobutadiene	50.0000	44.5483	10.9	25.0
107	Napthalene	50.0000	52.6883	5.4	25.0
108	1,2,3-Trichlorobenzene	50.0000	47.7573	4.5	25.0

Report Date: 30-Jun-2005 17:02

Calibration History

Method : /chem/G.i/062905.b/G5030-8260B-soil.m
Start Cal Date: 26-JAN-2005 11:49
End Cal Date : 28-JUN-2005 16:35

Initial Calibration

Injection Date	Sublist	Calibration File
Cal Level: 1 , Cal Amount: 5.00000		
09-JUN-2005 16:52	2-supp	/chem/G.i/060905i.b/g2703.d
28-JUN-2005 14:48	1-main	/chem/G.i/062805i.b/g3232.d
Cal Level: 2 , Cal Amount: 10.0000		
09-JUN-2005 17:13	2-supp	/chem/G.i/060905i.b/g2704.d
28-JUN-2005 15:10	1-main	/chem/G.i/062805i.b/g3233.d
Cal Level: 3 , Cal Amount: 20.0000		
09-JUN-2005 17:34	2-supp	/chem/G.i/060905i.b/g2705.d
28-JUN-2005 15:31	1-main	/chem/G.i/062805i.b/g3234.d
Cal Level: 4 , Cal Amount: 50.0000		
09-JUN-2005 17:55	2-supp	/chem/G.i/060905i.b/g2706.d
28-JUN-2005 15:52	1-main	/chem/G.i/062805i.b/g3235.d
Cal Level: 5 , Cal Amount: 100.000		
09-JUN-2005 18:17	2-supp	/chem/G.i/060905i.b/g2707.d
28-JUN-2005 16:14	1-main	/chem/G.i/062805i.b/g3236.d
Cal Level: 6 , Cal Amount: 200.000		
09-JUN-2005 18:38	2-supp	/chem/G.i/060905i.b/g2708.d
28-JUN-2005 16:35	1-main	/chem/G.i/062805i.b/g3237.d

Continuing Calibration

29-JUN-2005 09:25	2-supp	/chem/G.i/062905.b/g3269.d
29-JUN-2005 08:45	1-main	/chem/G.i/062905.b/g3268.d

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: G.i
Lab File ID: g3268.d
Analysis Type: SOIL

Injection Date: 29-JUN-2005 08:45
Lab Sample ID: MAIN050
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
85	1,2-Dichloroethene (total)	100.0000	96.5095	3.5	50.0
83	Xylene (total)	150.0000	152.7070	1.8	50.0
64	dichlorodifluoromethane	50.0000	52.0888	4.2	50.0
1	Chloromethane	50.0000	49.8796	0.2	50.0
4	Vinyl Chloride	50.0000	51.5021	3.0	20.0
2	Bromomethane	50.0000	49.3783	1.2	50.0
5	Chloroethane	50.0000	51.2795	2.6	50.0
11	Trichlorofluoromethane	50.0000	53.8383	7.7	50.0
3	Ethanol	2500.0000	2246.6717	10.1	50.0
8	Acrolein	500.0000	496.1965	0.8	50.0
7	Acetone	200.0000	181.4698	9.3	50.0
12	1,1-Dichloroethene	50.0000	46.5149	7.0	20.0
68	Acetonitrile	500.0000	539.6765	7.9	50.0
21	Iodomethane	50.0000	46.7872	6.4	50.0
86	tert-Butyl alcohol	1000.0000	936.0901	6.4	50.0
6	Methylene Chloride	50.0000	50.2035	0.4	50.0
9	Acrylonitrile	500.0000	491.2520	1.7	50.0
0	trans-1,2-Dichloroethene	50.0000	48.0790	3.8	50.0
84	Isopropyl ether	250.0000	249.0824	0.4	50.0
15	1,1-Dichloroethane	50.0000	47.7283	4.5	50.0
69	Chloroprene	50.0000	48.5815	2.8	50.0
20	2-Butanone	200.0000	189.2618	5.4	50.0
70	Propionitrile	500.0000	492.6457	1.5	50.0
0	cis-1,2-Dichloroethene	50.0000	48.4305	3.1	50.0
93	2,2-Dichloropropane	50.0000	50.7345	1.5	50.0
72	Methacrylonitrile	500.0000	524.7834	5.0	50.0
13	Bromochloromethane	50.0000	49.2827	1.4	50.0
17	Chloroform	50.0000	50.0732	0.1	20.0
71	Isobutanol	1000.0000	965.0366	3.5	50.0
22	1,1,1-Trichloroethane	50.0000	48.8045	2.4	50.0
94	1,1-Dichloropropene	50.0000	46.7473	6.5	50.0
23	Carbon Tetrachloride	50.0000	47.7434	4.5	50.0
16	1,2-Dichloroethane	50.0000	48.5292	2.9	50.0
30	Benzene	50.0000	46.0418	7.9	50.0
88	n-Butanol	1000.0000	879.4580	12.1	50.0
29	Trichloroethene	50.0000	48.2145	3.6	50.0
26	1,2-Dichloropropane	50.0000	48.7378	2.5	20.0
57	1,4-Dioxane	2500.0000	2297.8436	8.1	50.0
34	Dibromomethane	50.0000	47.0375	5.9	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: G.i
Lab File ID: g3268.d
Analysis Type: SOIL

Injection Date: 29-JUN-2005 08:45
Lab Sample ID: MAIN050
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
25	Bromodichloromethane	50.0000	49.4829	1.0	50.0
28	cis-1,3-Dichloropropene	50.0000	50.8623	1.7	50.0
38	4-Methyl-2-pentanone	200.0000	197.0785	1.5	50.0
45	Toluene	50.0000	49.3703	1.3	20.0
31	trans-1,3-Dichloropropene	50.0000	52.1794	4.4	50.0
32	1,1,2-Trichloroethane	50.0000	47.9835	4.0	50.0
43	2-Hexanone	200.0000	201.9788	1.0	50.0
109	1,3-Dichloropropane	50.0000	50.0064	0.0	50.0
42	Tetrachloroethene	50.0000	47.1465	5.7	50.0
36	Dibromochloromethane	50.0000	50.4305	0.9	50.0
58	1,2-Dibromoethane	50.0000	48.3323	3.3	50.0
92	1-Chlorohexane	50.0000	50.6610	1.3	50.0
46	Chlorobenzene	50.0000	49.6712	0.7	50.0
47	Ethylbenzene	50.0000	48.9206	2.2	20.0
74	1,1,1,2-Tetrachloroethane	50.0000	49.4993	1.0	50.0
0	m and p-Xylene	100.0000	101.9856	2.0	50.0
49	Styrene	50.0000	52.0898	4.2	50.0
0	o-Xylene	50.0000	50.7214	1.4	50.0
37	Bromoform	50.0000	49.5322	0.9	50.0
79	isopropyl benzene	50.0000	51.8337	3.7	50.0
76	Cyclohexanone	2000.0000	1737.0656	13.1	50.0
40	1,1,2,2-Tetrachloroethane	50.0000	48.2427	3.5	50.0
50	1,2,3-Trichloropropane	50.0000	46.3960	7.2	50.0
95	Bromobenzene	50.0000	49.4720	1.1	50.0
96	n-Propylbenzene	50.0000	50.4631	0.9	50.0
98	1,3,5-Trimethylbenzene	50.0000	49.3448	1.3	50.0
97	2-Chlorotoluene	50.0000	48.6755	2.6	50.0
99	4-Chlorotoluene	50.0000	50.1742	0.3	50.0
100	tert-Butylbenzene	50.0000	53.3858	6.8	50.0
101	1,2,4-Trimethylbenzene	50.0000	49.8125	0.4	50.0
102	sec-Butylbenzene	50.0000	50.1008	0.2	50.0
103	4-Isopropyltoluene	50.0000	51.4651	2.9	50.0
61	m-Dichlorobenzene	50.0000	49.7274	0.5	50.0
62	p-dichlorobenzene	50.0000	49.0547	1.9	50.0
104	n-Butylbenzene	50.0000	51.3406	2.7	50.0
63	o-Dichlorobenzene	50.0000	49.5502	0.9	50.0
75	1,2-Dibromo-3-chloropropane	50.0000	43.2491	13.5	50.0
105	1,2,4-Trichlorobenzene	50.0000	49.8460	0.3	50.0
106	Hexachlorobutadiene	50.0000	48.1082	3.8	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: G.i
Lab File ID: g3268.d
Analysis Type: SOIL

Injection Date: 29-JUN-2005 08:45
Lab Sample ID: MAIN050
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D
107 Napthalene	50.0000	45.2179	9.6	50.0
108 1,2,3-Trichlorobenzene	50.0000	48.5250	3.0	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: G.i
Lab File ID: g3268.d
Analysis Type: SOIL
Lab Sample ID: MAIN050
Quant Type: ISTD

Injection Date: 29-JUN-2005 08:45
Init. Calibration Date(s): JAN/26/5 06/28/5
Init. Calibration Times: 11:49 16:35
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

	COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
M	1 1,2-Dichloroethene (total)	0.468	0.452	0.010	3.5	50.0
M	2 Xylene (total)	4.298	4.167	0.010	3.1	50.0
	3 dichlorodifluoromethane	0.428	0.446	0.010	-4.2	50.0
	5 Chloromethane	0.743	0.741	0.100	0.2	50.0
	6 Vinyl Chloride	0.697	0.717	0.020	-3.0	20.0
	8 Bromomethane	0.432	0.427	0.010	1.2	50.0
	9 Chloroethane	0.335	0.343	0.010	-2.6	50.0
	11 Trichlorofluoromethane	0.613	0.660	0.010	-7.7	50.0
	12 Ethanol	0.008	0.007	0.000	10.1	50.0
	14 Acrolein	0.128	0.127	0.005	0.8	50.0
	17 1,1-Dichloroethene	0.476	0.442	0.020	7.0	20.0
	15 Acetone	0.215	0.195	0.010	9.3	50.0
	18 Iodomethane	0.988	0.925	0.010	6.4	50.0
	19 Acetonitrile	0.064	0.069	0.001	-7.9	50.0
	24 Methylene Chloride	0.571	0.602	0.010	N/A	N/A
	23 tert-Butyl alcohol	0.069	0.064	0.001	6.4	50.0
	25 Acrylonitrile	0.220	0.217	0.010	1.7	50.0
	27 trans-1,2-Dichloroethene	0.496	0.477	0.010	3.8	50.0
	31 1,1-Dichloroethane	0.838	0.800	0.100	4.5	50.0
	30 Isopropyl ether	0.301	0.300	0.010	0.4	50.0
	32 Chloroprene	0.438	0.426	0.010	2.8	50.0
	34 2-Butanone	0.237	0.224	0.010	5.4	50.0
	37 cis-1,2-Dichloroethene	0.440	0.426	0.010	3.1	50.0
	38 2,2-Dichloropropane	0.425	0.432	0.010	-1.5	50.0
	36 Propionitrile	0.060	0.059	0.001	1.5	50.0
	39 Methacrylonitrile	0.255	0.267	0.010	-5.0	50.0
	40 Bromochloromethane	0.279	0.275	0.010	1.4	50.0
	41 Chloroform	0.710	0.711	0.020	-0.1	20.0
	44 1,1,1-Trichloroethane	0.459	0.448	0.010	2.4	50.0
	47 1,1-Dichloropropene	0.465	0.435	0.010	6.5	50.0
	48 Carbon Tetrachloride	0.473	0.452	0.010	4.5	50.0
	45 Isobutanol	0.015	0.015	0.000	3.5	50.0
	51 Benzene	1.268	1.168	0.010	7.9	50.0
	50 1,2-Dichloroethane	0.520	0.505	0.010	2.9	50.0
	54 n-Butanol	0.011	0.010	0.000	12.1	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: G.i
Lab File ID: g3268.d
Analysis Type: SOIL
Lab Sample ID: MAIN050
Quant Type: ISTD

Injection Date: 29-JUN-2005 08:45
Init. Calibration Date(s): JAN/26/5 06/28/5
Init. Calibration Times: 11:49 16:35
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

	COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
55	Trichloroethene	0.393	0.379	0.010	3.6	50.0
58	1,2-Dichloropropane	0.391	0.381	0.020	2.5	20.0
60	1,4-Dioxane	0.004	0.004	0.000	8.1	50.0
61	Dibromomethane	0.354	0.333	0.010	5.9	50.0
62	Bromodichloromethane	0.530	0.525	0.010	1.0	50.0
65	cis-1,3-Dichloropropene	0.568	0.577	0.010	-1.7	50.0
66	4-Methyl-2-pentanone	1.586	1.562	0.010	1.5	50.0
68	Toluene	4.884	4.823	0.020	1.3	20.0
69	trans-1,3-Dichloropropene	1.875	1.957	0.010	-4.4	50.0
71	1,1,2-Trichloroethane	1.361	1.306	0.010	4.0	50.0
74	Tetrachloroethene	1.211	1.142	0.010	5.7	50.0
73	1,3-Dichloropropane	2.170	2.170	0.010	0.0	50.0
72	2-Hexanone	1.170	1.182	0.010	-1.0	50.0
75	Dibromochloromethane	1.921	1.938	0.010	-0.9	50.0
77	1,2-Dibromoethane	1.763	1.705	0.010	3.3	50.0
78	1-Chlorohexane	1.888	1.913	0.010	-1.3	50.0
80	Chlorobenzene	3.974	3.948	0.300	0.7	50.0
81	1,1,1,2-Tetrachloroethane	1.463	1.449	0.010	1.0	50.0
82	Ethylbenzene	1.796	1.757	0.010	2.2	20.0
83	m and p-Xylene	2.251	2.295	0.010	-2.0	50.0
84	o-Xylene	2.295	2.328	0.010	-1.4	50.0
85	Styrene	3.759	3.917	0.010	-4.2	50.0
86	Bromoform	1.442	1.429	0.101	0.9	50.0
87	isopropyl benzene	5.621	5.827	0.010	-3.7	50.0
89	Cyclohexanone	0.087	0.075	0.005	13.1	50.0
91	1,1,2,2-Tetrachloroethane	1.518	1.464	0.300	3.5	50.0
94	Bromobenzene	1.218	1.205	0.010	1.1	50.0
93	1,2,3-Trichloropropane	0.350	0.324	0.010	7.2	50.0
95	n-Propylbenzene	0.990	0.999	0.010	-0.9	50.0
96	2-Chlorotoluene	1.010	0.983	0.010	2.6	50.0
97	1,3,5-Trimethylbenzene	3.024	2.985	0.010	1.3	50.0
98	4-Chlorotoluene	1.002	1.005	0.010	-0.3	50.0
99	tert-Butylbenzene	2.698	2.881	0.010	-6.8	50.0
100	1,2,4-Trimethylbenzene	3.090	3.079	0.010	0.4	50.0
101	sec-Butylbenzene	3.966	3.974	0.010	-0.2	50.0

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: G.i
Lab File ID: g3268.d
Analysis Type: SOIL
Lab Sample ID: MAIN050
Quant Type: ISTD

Injection Date: 29-JUN-2005 08:45
Init. Calibration Date(s): JAN/26/5 06/28/5
Init. Calibration Times: 11:49 16:35
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D
103 m-Dichlorobenzene	2.049	2.038	0.010	0.5	50.0
102 4-Isopropyltoluene	3.235	3.330	0.010	-2.9	50.0
105 p-dichlorobenzene	2.138	2.097	0.010	1.9	50.0
107 n-Butylbenzene	3.336	3.425	0.010	-2.7	50.0
108 o-Dichlorobenzene	1.992	1.974	0.010	0.9	50.0
109 1,2-Dibromo-3-chloropropane	0.306	0.265	0.010	13.5	50.0
110 1,2,4-Trichlorobenzene	1.269	1.265	0.010	0.3	50.0
111 Hexachlorobutadiene	0.718	0.691	0.010	3.8	50.0
112 Napthalene	2.825	2.555	0.010	9.6	50.0
113 1,2,3-Trichlorobenzene	1.207	1.171	0.010	3.0	50.0

CONTINUING CALIBRATION COMPOUNDS
PERCENT DRIFT REPORT

Instrument ID: G.i
Lab File ID: g3269.d
Analysis Type: SOIL

Injection Date: 29-JUN-2005 09:25
Lab Sample ID: SUPP050
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

	COMPOUND	EXPECTED CONC.	MEASURED CONC.	%D	MAX %D	
118	Dichlorotetrafluoroethane	50.0000	86.9475	73.9	80.0	
120	Ethylene Oxide	6250.0000	8348.4973	33.6	50.0	
87	Dichlorofluoromethane	50.0000	44.0541	11.9	50.0	
126	1,2-dichloro-1,1,2-trifluoroeth	50.0000	35.8303	28.3	50.0	
77	Ethyl Ether	50.0000	50.5057	1.0	50.0	
127	2,2-dichloro-1,1,1-trifluoroeth	50.0000	42.2115	15.6	50.0	
65	Trichlorotrifluoroethane	50.0000	38.4656	23.1	50.0	
128	2-Propanol	1000.0000	1235.8081	23.6	50.0	
121	Methyl Acetate	250.0000	318.8294	27.5	50.0	
67	Allyl Chloride	50.0000	50.4579	0.9	50.0	
10	Carbon Disulfide	50.0000	56.1214	12.2	50.0	
53	Methyl t-butyl ether	50.0000	57.4368	14.9	50.0	
54	Hexane	50.0000	57.5428	15.1	50.0	
24	Vinyl acetate	100.0000	125.9942	26.0	50.0	
122	ETBE	250.0000	315.4120	26.2	50.0	
78	Ethyl Acetate	100.0000	130.3438	30.3	50.0	
56	Tetrahydrofuran	100.0000	135.1460	35.1	50.0	
89	Dibromofluoromethane	50.0000	46.3397	7.3	50.0	
115	Cyclohexane	50.0000	51.4707	2.9	80.0	
303	1,2-Dichloroethane-d4	50.0000	49.7772	0.4	50.0	
123	TAME	250.0000	294.3728	17.7	50.0	
116	2-Pentanone	200.0000	271.4952	35.7	50.0	
73	Methyl Methacrylate	100.0000	118.5860	18.6	50.0	
124	Methyl Cyclohexane	50.0000	55.8251	11.7	50.0	
82	2-nitropropane	50.0000	67.1119	34.2	50.0	
35	2-Chloroethyl vinyl ether	50.0000	36.2550	27.5	50.0	
301	Toluene-d8	50.0000	44.6623	10.7	50.0	
41	Ethyl methacrylate	100.0000	125.2418	25.2	50.0	
125	Tetrahydrothiophene	50.0000	37.6281	24.7	50.0	
117	cis-1,4-Dichloro-2-butene	50.0000	62.9603	25.9	50.0	
302	Bromofluorobenzene	50.0000	42.3394	15.3	50.0	
60	t-1,4-Dichloro-2-butene	50.0000	81.3077	62.6	50.0	<-
119	1,2,3-Trimethylbenzene	50.0000	54.9482	9.9	50.0	

STL Denver

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: G.i
Lab File ID: g3269.d
Analysis Type: SOIL
Lab Sample ID: SUPP050
Quant Type: ISTD

Injection Date: 29-JUN-2005 09:25
Init. Calibration Date(s): JAN/26/5 06/28/5
Init. Calibration Times: 11:49 16:35
Method File: /chem/G.i/062905.b/G5030-8260B-soil.m

	COMPOUND	RRF	RF50	MIN RRF	%D	MAX %D	
$	43 Dibromofluoromethane	0.489	0.453	0.010	7.3	50.0	
$	49 1,2-Dichloroethane-d4	0.363	0.361	0.010	0.4	50.0	
$	67 Toluene-d8	4.017	3.588	0.010	10.7	50.0	
$	90 Bromofluorobenzene	1.896	1.606	0.010	15.3	50.0	
	4 Dichlorotetrafluoroethane	0.334	0.581	0.010	-73.9	80.0	
	7 Ethylene Oxide	0.022	0.029	0.010	-33.6	50.0	
	10 Dichlorofluoromethane	1.166	1.027	0.010	11.9	50.0	
	126 1,2-dichloro-1,1,2-trifluor	0.565	0.405	0.010	28.3	50.0	
	13 Ethyl Ether	0.476	0.481	0.010	-1.0	50.0	
	127 2,2-dichloro-1,1,1-trifluor	0.829	0.700	0.010	15.6	50.0	
	16 Trichlorotrifluoroethane	0.438	0.337	0.010	23.1	50.0	
	128 2-Propanol	0.038	0.046	0.001	-23.6	50.0	
	20 Methyl Acetate	0.394	0.502	0.010	-27.5	50.0	
	21 Allyl Chloride	0.711	0.717	0.010	-0.9	50.0	
	22 Carbon Disulfide	1.892	2.124	0.010	-12.2	50.0	
	26 Methyl t-butyl ether	0.991	1.138	0.010	-14.9	50.0	
	28 Hexane	1.784	2.053	0.010	-15.1	50.0	
	29 Vinyl acetate	0.751	0.946	0.010	-26.0	50.0	
	33 ETBE	0.834	1.053	0.010	-26.2	50.0	
	35 Ethyl Acetate	0.336	0.437	0.010	-30.3	50.0	
	42 Tetrahydrofuran	0.077	0.104	0.010	-35.1	50.0	
	46 Cyclohexane	0.445	0.458	0.010	-2.9	80.0	
	52 TAME	0.643	0.757	0.010	-17.7	50.0	
	56 2-Pentanone	0.240	0.326	0.010	-35.7	50.0	
	57 Methyl Methacrylate	0.074	0.088	0.010	-18.6	50.0	
	59 Methyl Cyclohexane	0.388	0.433	0.010	-11.7	50.0	
	63 2-nitropropane	0.229	0.307	0.010	-34.2	50.0	
	64 2-Chloroethyl vinyl ether	0.099	0.059	0.002	N/A	N/A	
	70 Ethyl methacrylate	1.303	1.632	0.010	-25.2	50.0	
	76 Tetrahydrothiophene	0.606	0.456	0.010	24.7	50.0	
	88 cis-1,4-Dichloro-2-butene	0.349	0.439	0.010	-25.9	50.0	
	92 t-1,4-Dichloro-2-butene	0.172	0.280	0.010	-62.6	50.0	<-
	106 1,2,3-Trimethylbenzene	2.888	3.173	0.010	-9.9	50.0	

FORM 8
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5181482 SAS No.: 8260B SDG No.: D5F250124

Lab File ID (Standard): G3235 Date Analyzed: 06/28/05

Instrument ID: G Time Analyzed: 1552

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) Y

		IS1(CBZ) AREA #	RT #	IS2 AREA #	RT #	IS3(DCB) AREA #	RT #
	12 HOUR STD	470913	9.92	1716754	7.77	761061	12.22
	UPPER LIMIT	941826	10.42	3433508	8.27	1522122	12.72
	LOWER LIMIT	235456	9.42	858377	7.27	380530	11.72
	CLIENT SAMPLE NO.						
01	ICV	520603	9.92	1860854	7.78	826143	12.22
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (CBZ) = Chlorobenzene-d5
IS2 = Fluorobenzene
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

FORM 8
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: STL-DENVER Contract:

Lab Code: Case No.: 5181482 SAS No.: 8260B SDG No.: D5F250124

Lab File ID (Standard): G3269 Date Analyzed: 06/29/05

Instrument ID: G Time Analyzed: 0925

GC Column: DB624 ID: 0.53 (mm) Heated Purge: (Y/N) Y

		IS1(CBZ) AREA #	RT #	IS2 AREA #	RT #	IS3(DCB) AREA #	RT #
	12 HOUR STD	480435	9.91	1693277	7.77	719920	12.21
	UPPER LIMIT	960870	10.41	3386554	8.27	1439840	12.71
	LOWER LIMIT	240218	9.41	846638	7.27	359960	11.71
	CLIENT SAMPLE NO.						
01	LCS	454190	9.91	1607731	7.77	670389	12.20
02	LCSD	353500	9.91	1403983	7.78	492718	12.21
03	PBLK	424215	9.92	1547297	7.77	617719	12.22
04	BH-B-1112	438584	9.91	1555423	7.78	640552	12.21
05	BH-B-0506	405399	9.92	1551238	7.77	589168	12.21
06	BH-A-0102	423980	9.92	1516057	7.78	585137	12.21
07	BH-A-0506	425919	9.92	1508997	7.78	641557	12.21
08	BH-9A-0506	419615	9.91	1506685	7.77	612693	12.21
09	AC-BH002-040	458373	9.91	1675543	7.77	660021	12.21
10	AC-BH002-070	492170	9.91	1727971	7.77	784238	12.20
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

IS1 (CBZ) = Chlorobenzene-d5
IS2 = Fluorobenzene
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

General Chemistry

CLP-Like Forms

Lot ID: D5F250124

Client: Ashland Chemical Company

Method: MCAWW Percent Moisture

Associated Samples: 002, 004, 005, 006, 009, 010, 011, 012, 013

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-D-1112
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-002
Matrix:	SOLID	**Lab WorkOrder:**	HED64
% Moisture:	19	**Date/Time Collected:**	06/24/05 09:28
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	19		0.10	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-C-1112
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-004
Matrix:	SOLID	**Lab WorkOrder:**	HED67
% Moisture:	19	**Date/Time Collected:**	06/24/05 09:52
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	**19**		0.10	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-B-0102
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-005
Matrix:	SOLID	**Lab WorkOrder:**	HED69
% Moisture:	13	**Date/Time Collected:**	06/24/05 10:10
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	13		0.10	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-B-0506
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-006
Matrix:	SOLID	**Lab WorkOrder:**	HED7A
% Moisture:	18	**Date/Time Collected:**	06/24/05 10:18
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	18		0.10	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-A-0102
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-009
Matrix:	SOLID	**Lab WorkOrder:**	HED7F
% Moisture:	12	**Date/Time Collected:**	06/24/05 11:36
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	12		0.10	

U Result is less than the method detection limit (MDL).

Form 1 Analysis Data Sheet Equivalent

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-A-0506
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-010
Matrix:	SOLID	**Lab WorkOrder:**	HED7H
% Moisture:	14	**Date/Time Collected:**	06/24/05 11:40
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	14		0.10	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-9A-0506
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-011
Matrix:	SOLID	**Lab WorkOrder:**	HED7K
% Moisture:	14	**Date/Time Collected:**	06/24/05 12:00
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	14		0.10	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	AC-BH002-0405
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-012
Matrix:	SOLID	**Lab WorkOrder:**	HED7M
% Moisture:	17	**Date/Time Collected:**	06/24/05 12:36
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	17		0.10	

U Result is less than the method detection limit (MDL).

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	AC-BH002-0708
Lot/SDG Number:	D5F250124	**Lab Sample ID:**	D5F250124-013
Matrix:	SOLID	**Lab WorkOrder:**	HED7P
% Moisture:	19	**Date/Time Collected:**	06/24/05 12:40
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
Sample Aliquot:		**Instrument ID:**	BAL
Dilution Factor:	1		

CAS No.	Analyte	Conc.	MDL	RL	Q
Q1028	Percent Moisture	**19**		0.10	

U Result is less than the method detection limit (MDL).

Form 1 Analysis Data Sheet Equivalent

SEVERN TRENT STL

Ashland Chemical Company

Wet Chemistry Analysis Data Sheet

Lab Name:	STL DENVER	**Client Sample ID:**	BH-D-1112 DUP
Lot/SDG Number:	D5F250124	**MSD Lab Sample ID:**	D5F250124-002X
Matrix:	SOLID	**MSD Lab WorkOrder:**	HED64
% Moisture:	19	**Date/Time Collected:**	06/24/05 09:28
Basis:	Wet	**Date/Time Received:**	06/25/05 08:30
Analysis Method:	160.3 MOD	**Date/Time Leached:**	
Unit:	%	**Date/Time Extracted:**	07/05/05 12:00
QC Batch ID:	5186520	**Date/Time Analyzed:**	07/05/05 15:00
MSD Sample Aliquot:		**Instrument ID:**	BAL
MSD Dilution Factor:	1		

Analyte	RPD Limit	Sample Result	C	Duplicate Result	C	RPD	Q
Percent Moisture	20	19		18		5.3	

U Result is less than the method detection limit (MDL).

Chain of Custody Record

2.6° 6/25/05

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL Denver
4955 Yarrow Street
Arvada, CO 80002

128

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
URS CORP	DEAN STOCKWELL	6-24-05	327937
Address 700 3RD ST SOUTH SUITE 700	**Telephone Number (Area Code)/Fax Number** 612-373-6881 612-370-1378	**Lab Number**	**Page** 1 of 2
City MINNEAPOLIS / **State** MN / **Zip Code** 55415	**Site Contact** LAWRENCE CANNON	**Lab Contact** PAT MCENTEE	
Project Name and Location (State) ASHLANT CHEMICAL CLEARFIELD UT	**Carrier/Waybill Number** FED EX		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: 8260 B PCE	Special Instructions/ Conditions of Receipt
TB-062405	5-15-05			X						2			X	LAB PREPARED
BH-D-1112	6-24-05	928				X	4						X	PCE ONLY
FB-062405	6-24-05	930		X						3			X	PCE ONLY
BH-C-1112	6-24-05	952				X	4						X	PCE ONLY
BH-B-0102	6-24-05	1010				X	4						X	PCE ONLY
BH-B-0506	6-24-05	1018				X	4						X	PCE ONLY
BH-9E-1216	6-24-05	1000		X			3 add			3			X	PCE ONLY
BH-E-1216	6-24-05	1100		X			4 add			4			X	PCE ONLY MS/MSD
BH-A-0102	6-24-05	1136				X	4						X	PCE ONLY
BH-A-0506	6-24-05	1140				X	4						X	PCE ONLY
BH-9A-0506	6-24-05	1200				X	4						X	PCE ONLY
AC-BH002-0405	6-24-05	1236				X	4						X	PCE ONLY

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☒ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By	6-24-05	1300	1. Received By	6/25/05	0830
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL Denver
4955 Yarrow Street
Arvada, CO 80002

129

STL-4124 (0901)

Client: URS CorP	Project Manager: DEAN STOCKWELL	Date: 6-24-05	Chain of Custody Number: 327938
Address: 700 3rd ST South Suite 700	Telephone Number (Area Code)/Fax Number: 612-373-6881 612-370-1378	Lab Number:	Page 2 of 2
City: MINNEAPOLIS / State: MN / Zip Code: 55415	Site Contact: LAWRENCE CANNON	Lab Contact: PAT MCENTEE	Analysis (Attach list if more space is needed)
Project Name and Location (State): ASHLAND CHEMICAL CLEARFIELD UT	Carrier/Waybill Number: FED EX		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	8260B PCE only	Temperature	Special Instructions/ Conditions of Receipt
AC-BH002-0708	6-24-05	1240				X	4						X		PCE ONLY
TEMP BLANK				X			1							X	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☒ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By	Date: 6-24-05	Time: 1300	1. Received By	Date: 6/25/05	Time: 0830
2. Relinquished By	Date:	Time:	2. Received By	Date:	Time:
3. Relinquished By	Date:	Time:	3. Received By	Date:	Time:

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

STL Denver

Sample Receiving Checklist

Lot #: D5F250124 Date/Time Received: 6/25/05

Company Name & Sampling Site: ASHLAND Clearfield UT

PM to Complete This Section: *Yes* ☐ *No* ☑ Residual chlorine check required: ☐

Yes ☐ *No* ☑ Quarantined :

Quote #: 65347

Special Instructions:

En Cores - LAB pres. within 48 hours

Time Zone:
• EDT/EST • CDT/CST • MDT/MST • PDT/PST • OTHER

Unpacking Checks:

Cooler #(s): 1

Temperatures (°C): 2.6

N/A	*Yes*	*No*		*Initials*
☐	☑	☐	1. Cooler seals intact? (N/A if hand delivered) If no, document on CUR.	
	☒	☐	2. Chain of custody present? If no, document on CUR.	
	☐	☑	3. Bottles broken and/or are leaking? If yes, document on CUR.	
	☐	☒	4. Multiphasic samples obvious? If yes, document on CUR.	
	☑	☐	5. Proper container & preservatives used? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR.	
☒	☐	☐	6. pH of all samples checked and meet requirements? If no, document on CUR.	
	☒	☐	7. Sufficient volume provided for all analysis requested? (ref. Attachment D of SOP# DEN-QA-0003) If no, document on CUR, and contact PM before proceeding.	
	☐	☒	8. Did chain of custody agree with labels ID and samples received? If no, document on CUR.	
☐	☒	☐	9. Were VOA samples without headspace? If no, document on CUR.	
☐	☒	☐	10. Were VOA vials preserved? Preservative ☒HCl ☐4±2°C ☐Sodium Thiosulfate ☐ Ascorbic Acid	
	☐	☒	11. Did samples require preservation with sodium thiosulfate?	
☒	☐	☐	12. If yes to #11, did the samples contain residual chlorine? If yes, document on CUR.	
☒	☐	☐	13. Sediment present in dissolved/filtered bottles? If yes, document on CUR.	
☒	☐	☐	14. Is sufficient volume provided for client requested MS, MSD or matrix duplicates? If no, document on CUR, and contact PM before proceeding.	
	☐	☒	15. Receipt date(s) > 48 hours past the collection date(s)? If yes, notify PA/PM.	
	☒	☐	16. Are analyses with short holding times requested?	
	☐	☒	17. Was a quick Turn Around (TAT) requested?	

STL Denver

Sample Receiving Checklist

Lot # DSF 250124

Login Checks: *Initials* AW

N/A	Yes	No		
	☑	☐	18. Sufficient volume provided for all analysis requested? (ref. Attachment D of SOP# DEN-QA-0003)	If no, document on CUR, and contact PM before proceeding.
☑	☐	☐	19. Is sufficient volume provided for client requested MS, MSD or matrix duplicates?	If no, document on CUR, and contact PM before proceeding.
	☑	☐	20. Did the chain of custody includes "received by" and "relinquished" by signatures, dates, and times?	
☐	☑	☐	21. Were special log in instructions read and followed?	
☑	☐	☐	22. Were AFCEE metals logged for refrigerated storage?	
	☑	☐	23. Were tests logged checked against the COC? Which samples were confirmed? All	
☑	☐	☐	24. Was a Rush form completed for quick TAT?	
☐	☑	☐	25. Was a Short Hold form completed for any short holds?	
	☐	☑	26. Is "Strict ICOC" required?	
	☐	☑	27. Were special archiving instructions indicated in the General Comments?	If so, what were they?

Labeling and Storage Checks: *Initials* JB

☑	☐	☐	28. Was the subcontract COC signed and sent with samples to bottle prep?
	☑	☐	29. Were sample labels double-checked by a second person?
☐	☐	☐	30. Were sample bottles and COC double checked for dissolved/filtered metals by a second person?
	☑	☐	31. Did the sample ID, Date, and Time from label match what was logged?
☑	☐	☐	32. Were stickers for special archiving instructions affixed to each box and to the ICOC? See #27
☑	☐	☐	33. Were AFCEE metals stored refrigerated?
☑	☐	☐	34. Were "Strict ICOC" copies given to satellite storage areas?

Document any problems or discrepancies and the actions taken to resolve them on a Condition Upon Receipt Anomaly Report (CUR).

APPENDIX C
NURE Data

7 MILE RADIUS

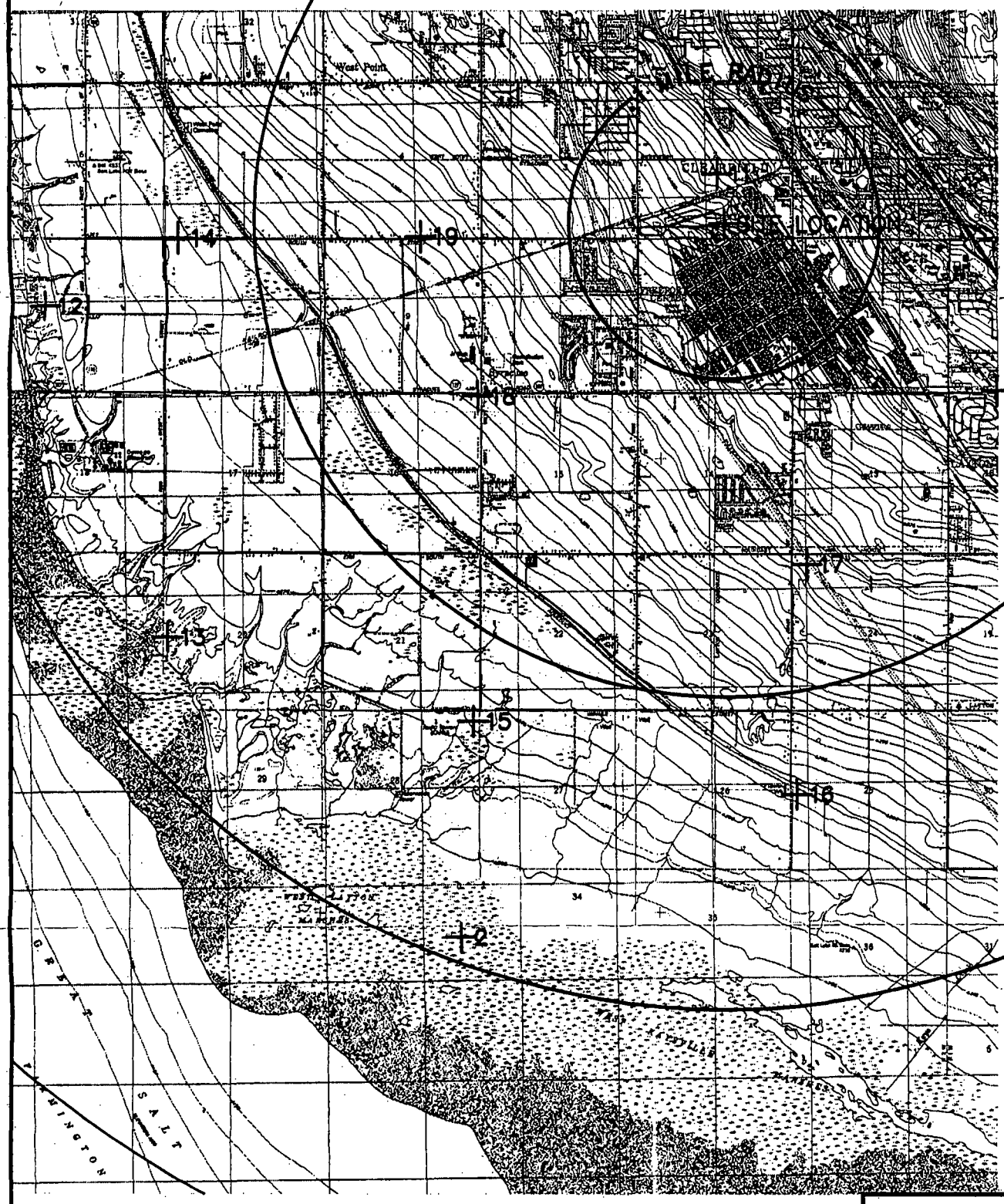
5 MILE RADIUS

3 MILE RADIUS

SITE RADIUS

SITE LOCATION

9 4 8 6 7 3 1 5 14 19 12 18 10 17 13 15 16 2



+8 # SAMPLE LOCATION

N

0 5000
SCALE IN FEET

URS
Thresher Square
700 Third Street South
Minneapolis, MN 55415
612.370.0700 Tel
612.370.1378 Fax

SITE LOCATION PLAN
NURE DATA POINT LOCATIONS
CLEARFIELD, UTAH

DRN BY: JAA	DATE: 01/15/03	PROJECT NO.	FIG. NO.
CHK'D BY: BG	DATE: 01/15/03	52010-125	APP C

PLOT DATE: Jan 15, 2003 2:44pm DISK FILE NAME: (15.08) V:\URS Projects\Ashland Inc\CLFD 48548-040\CAD\GPS-BASEMAP.dwg

Appendix C
National Uranium Reconnaissance Evaluation Data
Ashland Inc. / Clearfield DSO

REC_NO	TAPEFILE	DOELAB	SRLID	LLLID	REPLC	LAT	LONG	STATE	QUAD	MAPCODE	SAMPTYP	SSAMPTYP	SAMPDAT	SAMPLER	GRABS	WTRTEMP	PH	COND	ALK	SCIN	SGEOUNIT	ROCKTYP	SEDTYPE	STRWDTHC	STRDPTHC
5134404	XG0602-01	4	BCDH001S1		000	41.1468	-112.1023	UT	BRIGHAM CITY	NK1207	50	E	79/09/24	082	10	16.0000	7.5000	530.0000	5.8000	55.0000	QTRN	H	K	6	5
5134405	XG0602-01	4	BCDH002S1		000	41.1395	-112.0663	UT	BRIGHAM CITY	NK1207	59	G	79/09/24	082	10					40.0000	QTRN	H	I	D	D
5134406	XG0602-01	4	BCDH003S1		000	41.1642	-112.1121	UT	BRIGHAM CITY	NK1207	59	G	79/09/24	082	10					29.0000	QTRN	H	I	D	D
5134407	XG0602-01	4	BCDH004S1		000	41.2015	-112.1116	UT	BRIGHAM CITY	NK1207	59	G	79/09/24	082	10					40.0000	QTRN	H	I	D	D
5134409	XG0602-01	4	BCDH006S1		000	41.1400	-112.0345	UT	BRIGHAM CITY	NK1207	59	G	79/09/25	082	10					32.0000	QTRN	Z	I	D	D
5134410	XG0602-01	4	BCDH007S1		000	41.1752	-112.0641	UT	BRIGHAM CITY	NK1207	59	G	79/09/25	082	10					34.0000	QTRN	Z	I	D	D
5134411	XG0602-01	4	BCDH008S1		000	41.1763	-112.0187	UT	BRIGHAM CITY	NK1207	59	G	79/09/25	082	10					36.0000	QTRN	Z	I	D	D
5134412	XG0602-01	4	BCDH009S1		000	41.1905	-112.0204	UT	BRIGHAM CITY	NK1207	59	G	79/09/25	082	10					25.0000	QTRN	A	S	D	D
5134415	XG0602-01	4	BCDH012S1		000	41.2054	-112.0631	UT	BRIGHAM CITY	NK1207	59	G	79/09/26	082	10					32.0000	QTRN	Z	I	D	D
5134419	XG0602-01	4	BCDH016S1		000	41.0896	-112.0020	UT	BRIGHAM CITY	NK1207	59	G	79/10/02	082	10					50.0000	QTRN	Z	I	D	D
5134421	XG0602-01	4	BCDH018S1		000	41.1105	-112.0354	UT	BRIGHAM CITY	NK1207	59	G	79/10/09	082	10					50.0000	QTRN	Z	I	D	D
5134424	XG0602-01	4	BCDH021S1		000	41.0899	-112.1181	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					32.0000	QTRN	Z	S	D	D
5134426	XG0602-01	4	BCDH023S1		000	41.0688	-112.1025	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					55.0000	QTRN	Z	S	D	D
5134427	XG0602-01	4	BCDH024S1		000	41.1043	-112.1020	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					42.0000	QTRN	Z	I	D	D
5134428	XG0602-01	4	BCDH025S1		000	41.0601	-112.0641	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					42.0000	QTRN	Z	I	D	D
5134429	XG0602-01	4	BCDH026S1		000	41.0531	-112.0250	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					44.0000	QTRN	Z	I	D	D
5134430	XG0602-01	4	BCDH027S1		000	41.0744	-112.0243	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					44.0000	QTRN	Z	I	D	D
5134431	XG0602-01	4	BCDH028S1		000	41.0895	-112.0641	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					50.0000	QTRN	Z	I	D	D
5134432	XG0602-01	4	BCDH029S1		000	41.1040	-112.0716	UT	BRIGHAM CITY	NK1207	59	G	79/10/04	082	10					32.0000	QTRN	Z	I	D	D

WTRLEVEL	VEGTYPE	VEGDENS	RELIEF	CONTAMC	ANALDATE	U_XX_MTHD	U_XX_PPM	U_DN_PPM	AG_PPM	AL_PCT	AS_PPM	AU_PPM	BA_PPM	BE_PPM	CA_PCT	CD_PPM	CE_PPM	CO_PPM	CR_PPM	CU_PPM	DY_PPM	EU_PPM	FE_PCT	HF_PPM	K_PCT
N	G	M	I	G	80/12/16	SR3-XU	0.8000	1.8000	0.2000	2.1000	1.0000	-0.0100	33.0000	1.0000	0.0400		30.0000	15.0000	35.0000	26.0000	2.0000	-2.0000	0.7700	5.0000	1.4000
D	Z	S	I	F	81/02/13	SR3-XU	0.4000	2.4000	0.6000	3.2400	2.0000	-0.0100	43.0000	1.0000	2.7400		79.0000	-5.0000	20.0000	14.0000	0.1000	-2.0000	1.9600	10.0000	1.7000
D	Z	D	I	F	80/12/16	SR3-XU	0.5000	2.0000	0.2000	3.1300	1.0000	-0.0100	45.0000	2.0000	0.4100		28.0000	5.0000	30.0000	19.0000	2.9000	-2.0000	1.3800	7.0000	1.7000
D	G	D	I	G	81/02/13	SR3-XU	0.4000	2.1000	0.9000	2.6800	2.0000	-0.0100	48.0000	1.5000	3.2000		22.0000	5.0000	20.0000	15.0000		1.5000	1.0600	9.0000	1.6000
D	G	D	I	Z	80/12/16	SR3-XU	0.4000	1.8000	0.4000	1.8600	3.0000	-0.0100	33.0000	1.0000	0.7900		28.0000	-5.0000	20.0000	22.0000	1.6000	-2.0000	1.0200	10.0000	1.5000
D	G	M	I	0	80/12/16	SR3-XU	0.5000	2.5000	0.9000	2.2600	9.0000	-0.0100	60.0000	1.0000	3.8900		28.0000	-5.0000	25.0000	12.0000	0.9000	-2.0000	0.6000	7.0000	1.4000
D	G	M	I	F	80/12/16	SR3-XU	0.5000	2.1000	0.2000	2.6500	1.0000	-0.0100	70.0000	0.5000	0.0800		37.0000	-5.0000	25.0000	17.0000	0.3000	1.3000	1.5600	7.0000	1.6000
D	G	M	I	G	81/02/12	SR3-XU	0.6000	3.4000	0.4000	1.0900	3.0000	-0.0100	68.0000	1.0000	0.0400		48.0000	-5.0000	25.0000	18.0000	3.1000	-2.0000	1.4700	32.0000	1.3000
D	G	D	I	G	81/02/12	SR3-XU	0.6000	1.8000	0.5000	1.6900	1.0000	-0.0100	25.0000	1.0000	0.8600		11.0000	-5.0000	20.0000	18.0000	2.9000	-2.0000	0.8300	6.0000	1.5000
D	Z	M	I	F	80/12/16	SR3-XU	0.6000	1.5000	0.3000	2.7800	6.0000	-0.0100	18.0000	1.0000	1.1000		27.0000	8.0000	30.0000	19.0000	0.3000	1.0000	1.4600	6.0000	1.7000
D	Z	M	I	F	80/12/16	SR3-XU	0.4000	2.5000	0.4000	3.5300	4.0000	-0.0100	53.0000	1.0000	0.7800		34.0000	-5.0000	35.0000	15.0000	2.1000	-2.0000	0.8000	9.0000	1.7000
D	G	M	I	G	80/12/17	SR3-XU	0.4000	2.6000	0.5000	2.8100	4.0000	-0.0100	15.0000	1.0000	1.4300		15.0000	5.0000	20.0000	24.0000	2.7000	-2.0000	0.8900	11.0000	1.7000
D	G	S	I	G	80/12/17	SR3-XU	0.4000	1.6000	0.9000	2.2800		-0.0100	63.0000	1.0000	3.6900		44.0000	-5.0000	20.0000	15.0000		-2.0000	1.2000	4.0000	1.8000
D	G	M	I	G	80/12/17	SR3-XU	0.4000	2.2000	0.8000	2.3200		-0.0100	23.0000	1.5000	2.8900		33.0000	8.0000	20.0000	13.0000		-2.0000	1.1200	8.0000	1.5000
D	G	M	I	G	80/12/17	SR3-XU	0.4000	2.4000	0.6000	3.1800		-0.0100	70.0000	1.0000	1.7600		43.0000	5.0000	20.0000	18.0000	0.4000	-2.0000	1.9700	9.0000	1.5000
D	G	M	I	G	81/02/11	SR3-XU	1.1000	2.1000	0.5000	2.0800		-0.0100	15.0000	1.0000	1.3400		18.0000	-5.0000	25.0000	14.0000	4.6000	-2.0000	-0.5000	10.0000	1.7000
D	Z	M	I	F	81/02/12	SR3-XU	0.5000	2.0000	0.4000	2.2400	1.0000	-0.0100	35.0000	1.5000	0.3100		30.0000	-5.0000	30.0000	18.0000		-2.0000	1.6500	3.0000	1.8000
D	Z	M	I	F	80/12/17	SR3-XU	0.4000	2.2000	0.3000	3.4300	4.0000	-0.0100	33.0000	1.5000	0.2100		65.0000	8.0000	40.0000	18.0000		-2.0000	1.6800	6.0000	1.8000
D	Z	M	I	F	80/12/17	SR3-XU	0.3000	1.8000	0.7000	2.5800	5.0000	-0.0100	25.0000	1.5000	2.9400		12.0000	-5.0000	25.0000	11.0000	1.4000	1.2000	1.4300	5.0000	1.6000

LA_PPM	LI_PPM	LU_PPM	MG_PCT	MN_PPM	MO_PPM	NA_PCT	NB_PPM	NI_PPM	P_PPM	PB_PPM	SC_PPM	SE_PPM	SM_PPM	SN_PPM	TH_PPM	TI_PPM	V_PPM	W_PPM	Y_PPM	YB_PPM	ZN_PPM	METHODS
13.0000	9.0000		0.3450	180.0000	3.0000	0.3000	25.0000	15.0000	700.0000	15.0000	4.0000	2.0000	3.0000	10.0000	7.0000	1200.0000	40.0000	-2.0000	35.0000	-2.0000	48.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
	16.0000		0.2050	450.0000	-2.0000	0.5000	10.0000	10.0000	1100.0000	35.0000	4.7000	2.0000	3.0000	-5.0000	9.0000	2400.0000	40.0000	-2.0000	20.0000	-2.0000	40.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
69.0000	19.0000		0.3350	320.0000	-2.0000	0.5500	10.0000	10.0000	1000.0000	35.0000	2.9000	-1.0000	4.0000	-5.0000	7.0000	1600.0000	50.0000	-2.0000	30.0000	4.3000	58.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
	21.0000		0.4050	360.0000	2.0000	0.4300	5.0000	13.0000	1500.0000	50.0000	5.1000	2.0000	-5.0000	-5.0000	10.0000	1800.0000	40.0000	-2.0000	20.0000	-2.0000	33.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
10.0000	9.0000	0.3000	0.1650	190.0000	3.0000	0.2100	5.0000	8.0000	800.0000	40.0000	2.3000	2.0000	3.0000	10.0000	4.0000	1000.0000		-2.0000	20.0000	-2.0000	68.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
9.0000	9.0000		0.2800	190.0000	-2.0000	0.1600	10.0000	10.0000	700.0000	15.0000	3.5000	1.0000	1.0000	-5.0000	4.0000	500.0000	30.0000	-2.0000	25.0000	-2.0000	28.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
21.0000	15.0000	0.3000	0.0700	350.0000	2.0000	0.4700	10.0000	8.0000	800.0000	25.0000	4.1000	-1.0000	3.0000	-5.0000	9.0000	1400.0000	40.0000	-2.0000	25.0000	2.4000	45.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
	30.0000	0.5000	0.0250	200.0000	2.0000	0.1800	5.0000	-5.0000	800.0000	-10.0000	4.6000	-1.0000	2.0000	-5.0000	8.0000	1700.0000	20.0000	-2.0000	25.0000	-2.0000	53.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
	14.0000		0.2450	280.0000	-2.0000	0.3200	5.0000	8.0000	1000.0000	45.0000	0.7000	-1.0000	-5.0000	-5.0000	5.0000	1600.0000	30.0000	-2.0000	20.0000	-2.0000	100.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
20.0000	17.0000	0.2000	0.2100	2930.0000	2.0000		5.0000	13.0000	800.0000	35.0000	2.4000	-1.0000	3.0000	-5.0000	7.0000	3100.0000	40.0000	-2.0000	30.0000	-2.0000	58.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
14.0000	25.0000	0.2000	0.4100	280.0000	2.0000	0.2300	5.0000	10.0000	1100.0000	45.0000	5.1000	-1.0000	3.0000	-5.0000	4.0000	1300.0000	20.0000	-2.0000	10.0000	-2.0000	55.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
15.0000	23.0000	0.3000	0.6000	180.0000	-2.0000	0.3300	5.0000	8.0000	1300.0000	85.0000	5.6000	-1.0000	3.0000	-5.0000	6.0000	900.0000	10.0000	-2.0000	5.0000	-2.0000	45.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
18.0000	50.0000		0.4000	2970.0000	2.0000		5.0000	13.0000	1400.0000	25.0000	2.6000	1.0000	3.0000	-5.0000	6.0000		30.0000	-2.0000	15.0000	2.3000	33.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
16.0000	21.0000		0.6750	270.0000	-2.0000	0.3200	5.0000	8.0000	1300.0000	35.0000	3.7000	-1.0000	4.0000	-5.0000	5.0000	1700.0000	30.0000	-2.0000	10.0000	2.2000	58.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
28.0000	14.0000	0.4000	0.3850	390.0000	-2.0000	0.5700	5.0000	10.0000	1100.0000	30.0000	4.7000	1.0000	4.0000	-5.0000	9.0000	1600.0000	30.0000	-2.0000	-5.0000	-2.0000	38.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
38.0000	20.0000	0.3000	0.5000	290.0000	-2.0000	0.3000	5.0000	10.0000	1500.0000	40.0000	4.5000	1.0000	2.0000	-5.0000	7.0000	1600.0000	30.0000	-2.0000	-5.0000	6.4000	45.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
	24.0000		0.3750	270.0000	2.0000	0.2600	5.0000	10.0000	1300.0000	35.0000	2.0000	1.0000	3.0000	-5.0000	7.0000	1700.0000	30.0000	2.0000	5.0000	-2.0000	53.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
25.0000	25.0000		0.4100	410.0000	2.0000	0.4000	5.0000	10.0000	900.0000	45.0000	4.8000	1.0000	5.0000	-5.0000	12.0000	1400.0000	30.0000	-2.0000	15.0000	-2.0000	63.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX
19.0000	13.0000	0.2000	0.3950	280.0000	-2.0000	0.3100	5.0000	8.0000	500.0000	35.0000	4.0000	1.0000	3.0000	-5.0000	6.0000	1500.0000	30.0000	-2.0000	5.0000	-2.0000	35.0000	SR1, SR2, SR3-AA;CA;FE;XU;XX

REFORMAT	COMMENTS	COMMENT2
SUPPLEMENTAL ANALYSIS DATA ADDED FROM XG0602-04 RECORD: GOLD VALUE(-.01) ADDED BASED ON GJBX(82)-135 EXPLANATION		
SUPPLEMENTAL ANALYSIS DATA ADDED FROM XG0602-04 RECORD: GOLD VALUE(-.01) ADDED BASED ON GJBX(82)-135 EXPLANATION		
SUPPLEMENTAL ANALYSIS DATA ADDED FROM XG0602-04 RECORD: GOLD VALUE(-.01) ADDED BASED ON GJBX(82)-135 EXPLANATION		
SUPPLEMENTAL ANALYSIS DATA ADDED FROM XG0602-04 RECORD: GOLD VALUE(-.01) ADDED BASED ON GJBX(82)-135 EXPLANATION		
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SUPPLEMENTAL ANALYSIS DATA ADDED FROM XG0602-04 RECORD: GOLD VALUE(-.01) ADDED BASED ON GJBX(82)-135 EXPLANATION		

Notes:

All datapoints are within one tenth of a degree of the latitude and longitude of the site.

APPENDIX D
Human Health Risk Assessment Methodology

APPENDIX D
HUMAN HEALTH RISK ASSESSMENT METHODOLOGY

The purpose of the human health risk assessment (HHRA) for the Ashland Clearfield facility (the Facility) is to provide a risk-based interpretation of the data collected during the Phase I and II Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and to provide conservative estimates of potential human health risks posed by chemicals that are present in environmental media at the Facility. The data collected during implementation of the Phase I RFI Work Plan (URS Diamond, 2000) and Phase II RFI Work Plan (URS Diamond, 2005) were used to develop the HHRA for the solid waste management units (SWMUs) at the Facility.

1.0 OVERVIEW

In accordance with the Utah Department of Environmental Quality (UDEQ) guidance for Cleanup Action and Risk-Based Closure Standards (Utah Administrative Code [UAC] R315-101), the methodology for developing the HHRA follows guidance presented in the *Risk Assessment Guidance for Superfund: Vol. I Part A – Human Health Evaluation Manual* ("RAGS, Part A", USEPA, 1989) and several more recent regulatory guidance documents and resources as appropriate such as:

- *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (OSWER 9355.4-24, December 2002) (USEPA, 2002a)
- *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment* ("RAGS, Part E", USEPA/540/R/99/005, OSWER 9285.7-02EP, PB99-963312, July 2004) (USEPA, 2004a)
- *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (OSWER 9285.6-10 December 2002) (USEPA, 2002b)

The approach for developing an HHRA for the Facility incorporated the following fundamental components:

- Data Evaluation
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization
- Uncertainty Analysis

As discussed in Section 3.1.1 of the Phase I RFI Work Plan (URS Diamond, 2000), the HHRA was completed using actual exposure scenarios defined for the Facility.

The HHRA focuses on SWMUs, environmental media and constituents of concern (COCs) identified by UDEQ as requiring further evaluation subsequent to the Phase I RFI (per UDEQ's September 22, 2004 and February 14, 2005 correspondence). The Phase I RFI included a

detailed screening risk assessment and served to identify COCs in specific environmental media as Facility SWMUs. UDEQ indicated that COCs requiring further evaluation were as follows:

- Tetrachloroethylene (PCE) in soil at SWMUs 2, 3, 5, and 10
- PCE in groundwater at SWMU 7
- Dibenz(a,h)anthracene (D[a,h)A) and benzo(a)pyrene (B[a]P) at SWMU 4

Therefore, the HHRA will focus on data relative to these COCs collected during the Phase I and II RFI.

1.2 RISK ASSESSMENT

SWMUs containing chemical concentrations that exceed screening values (e.g. soil screening levels [SSLs] for soil and maximum contaminant levels [MCLs] for groundwater) require an HHRA as outlined in Section IV.J in the Hazardous Waste Permit for the Facility (UDEQ, 1997). The HHRA is a site-specific evaluation of a SWMU or a combination of several SWMUs. The evaluations included varying degrees of sophistication depending on the SWMU conditions and the nature and extent of impact as indicated below.

- If a SWMU or area poses a risk less than 1E-6 for carcinogens and a hazard index (HI) of less than 1 for noncarcinogens, then a No Further Action (NFA) petition is submitted to UDEQ.
- If the SWMU or area poses a cancer risk greater than 1E-6 for carcinogens, then the mitigation of potential risks are addressed using a Site Management Plan (SMP).
- If a SWMU or area poses a risk to human health greater than 1E-4 or an HI greater than one using the actual exposure scenario, then a Corrective Action Plan (CAP) is required.

2.0 DATA EVALUATION AND IDENTIFICATION OF CONSTITUENTS OF PRELIMINARY CONCERN

Presented in this appendix is detailed information regarding the approach that was used for developing an HHRA for the Facility.

2.1 DATA EVALUATION

One of the first steps of the HHRA process is to review data collected for previous investigations to develop a data set to support the Facility-specific HHRA. The analytical data from the Facility was reviewed to:

(1) Validate and organize sampling data that are of acceptable quality for their use in the detailed HHRA; and

(2) Identify COCs for the Facility.

Presented below is detailed information with respect to the methods that was used for the data quality evaluation.

2.2 DATA REVIEW PROTOCOL

The data review task included efforts related to the compilation of available analytical and field data for the Facility. The data from Phase I and Phase II RFIs were reviewed to:

- Identify the nature and extent of COCs; and
- Evaluate data usability, including any uncertainties associated with the data.

Described below is information relative to the methods that was used to develop a data set to support the development of the Facility-specific HHRA.

2.2.1 Qualified Data

Qualifiers pertaining to uncertainty in the identity or the reported concentration of an analyte may be assigned to certain analytical data by the laboratories or by persons performing data validation. Presented below is information with respect to the use of qualified data in the HHRA.

QUALIFIER	DEFINITION	USE OF QUALIFIED DATA IN HHRA?
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit (SQL).	If the analyte is selected as a COC, then it will be assumed to be present at one-half the SQL.
J	The analyte was positively identified; however, the associated numerical value is an estimate of the concentration of the analyte in the sample.	If the analyte is selected as a COC, it will be assumed to be present at the estimated concentration.

QUALIFIER	DEFINITION	USE OF QUALIFIED DATA IN HHRA?
UJ	The analyte was not detected above the reported SQL. However, the reported SQL is an estimate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.	If the analyte is selected as a COC, then it will be assumed to be present at one-half the SQL.
R	The sample results are rejected and are, therefore, unusable due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.	Data will be excluded from the quantitative HHRA.

2.2.2 Duplicate Results

Listed below are methodologies that were used to select the concentration term from duplicate analytical sampling results:

- If a chemical was detected in both samples, the average of measured concentrations was used as the concentration term.
- If a chemical was detected in one sample, then the measured concentration was selected as the concentration term, regardless of whether it was detected in the original or duplicate sample.
- If both duplicate samples were non-detect, then one-half of the lower reporting limit was adopted as the concentration term.

2.3 DATA TABULATION

The validated analytical results are presented in Tables 7 through 9 for soil and Tables 10 through 12 for groundwater in this Phase II RFI Report. Summary tables prepared in accordance with the format recommended in *RAGS, Part A* (USEPA, 1989), to present relevant statistical data, such as the frequency of detection, detection limits, the range of detected concentrations, the distribution of data set and the source term concentrations to be used in the HHRA are presented in Table D-1a and D-1b.

2.4 IDENTIFICATION OF PRELIMINARY CHEMICALS OF CONCERN

Although many chemicals might be identified in the environmental samples collected for RFIs, the results of an HHRA are often driven by a few chemicals and exposure pathways. To streamline the risk-based evaluation process, several methods have been developed by the regulatory agencies and the scientific community for the identification of chemicals and pathways that contribute significantly to the total risks posed by a site. For this Facility, only those chemicals with concentrations exceeding readily-available screening values (e.g., USEPA SSLs for soil and MCLs for groundwater) and inorganic background concentrations were evaluated further in the HHRA. This approach is outlined in Section IV.E of the Hazardous Waste Permit (UDEQ, 1997) and UAC R315-101. The detailed evaluation was provided in the

Phase I RFI (URS, 2003). Subsequent to the RFI, UDEQ identified the constituents PCE in soil and groundwater and B(a)P and D(a,h)A in soil as requiring further evaluation to support completion of the RFI. These compounds serve as the COCs selected for evaluation in the HHRA.

2.4.1 Risk-based Screening Approach

Evaluation of the data for the COCs from the Phase I and II RFI required development of appropriate exposure point concentrations (EPCs). The lesser of the maximum detected concentration and the 95% upper confidence limit of the arithmetic mean (95%UCL) of a chemical was selected as the EPC. The methodology used to calculate the 95% UCL is presented in the following paragraphs.

2.4.1.1 Calculation of 95%UCL

The approach used for computing the 95% UCL is consistent with the guidance provided in USEPA (2002b). The latest version of USEPA's ProUCL software was used as a tool for calculating the 95% UCL (USEPA, 2004b). ProUCL computes multiple statistics, and presents a recommendation for the appropriate exposure concentration. However, there are limitations to the application of ProUCL. Specifically, the currently available ProUCL does not consider nondetects in distribution testing and subsequent derivation of UCLs (although integration of nondetects is reportedly under development by USEPA). Therefore, manual modifications were made to the decision logic in ProUCL, which include the following:

- For purposes of calculating the 95% UCL, one-half of the SQL was adopted as surrogate values to represent nondetects.
- For data sets in which greater than 50% of the data are nondetects, non-parametric statistics were used to determine the 95% UCL, regardless of the value recommended in ProUCL.

Tables D-2 to D-5 present the output statistics generated by ProUCL.

3.0 EXPOSURE ASSESSMENT

Exposure assessment involves the identification of the potential human exposure pathways at the Facility based on the current and potential future land use scenarios. The exposure pathways link the sources, locations, types of environmental releases, and environmental fate with receptor locations and activity patterns. Generally, an exposure pathway is considered complete if it consists of the following four elements:

- A source and mechanism of release;
- A transport medium;
- An exposure point (i.e., point of potential contact with a potentially impacted medium); and
- An exposure route (e.g., ingestion) at the exposure point.

As outlined in Section 3.1.1 of the Phase I RFI Workplan, potential current and future use scenarios were presented. However, only complete exposure pathways were selected for a quantitative evaluation. Justifications for those scenarios and exposure pathways not evaluated in the HHRA are also provided in Section 3.1.1 of the Phase I Workplan (URS Diamond, 2000) and Section 5 of this report.

3.1 HUMAN HEALTH CONCEPTUAL FACILITY MODEL

The first step in the exposure assessment is to characterize areas to be evaluated in the HHRA with respect to its physical characteristics as well as those of the potential human populations at or near a site. Information gathered in this step will be used to support the identification and selection of exposure pathways that warrant further evaluation in the Facility-specific HHRA.

3.1.1 Known and Suspected Sources of COCs and Release Mechanisms

Based on information with respect to the history of the Facility and the results of the RFIs, the potential sources of COCs were primarily associated with past industrial operations. It is not clear that all constituent detections at the property are directly related to Facility operations alone as baseline environmental conditions were not determined for the beginning and end of the periods of use for all historical property owners and operators. Ashland leased the Facility in 1982 after the property was utilized for 40 years as part of a US Navy Supply Depot and more recently after 20 years as a railroad round house where locomotive servicing and repair was conducted. While the Facility has operated with close supervision from USEPA and UDEQ, previous operations at the property were conducted during timeframes when environmental practices and regulations were less formalized, if available or followed at all.

As to potential source and release mechanisms, the location and environmental media must be considered for the COCs. COCs were detected in subsurface soil and groundwater. Subsurface soil and groundwater may act as secondary sources of COCs through mechanisms such as leaching from soil to groundwater and wind and mechanical erosion of chemicals in soil (i.e., if subsurface soils are exposed during excavation).

3.1.2 Retention or Transport Media

Soil is the primary medium of interest, as direct releases to groundwater have not been demonstrated in the Phase I and II RFI. Dust could be considered a potential transport medium in the case where COCs in uncovered soil may become entrained in fugitive dust.

3.1.3 Transport Pathways

Further evaluation of release mechanisms and transport pathways on a SWMU-by-SWMU or a Facility-wide basis depending upon the exposure medium was conducted using the findings of the Phase I and II RFI. From a soils perspective, COCs were detected in subsurface soils and groundwater. Listed below are potential cross-media transfer mechanisms of COCs that can be conservatively identified:

- COCs in subsurface soil may enter groundwater.
- COCs in subsurface soil exposed during excavation activities may be transported to the atmosphere via volatilization or fugitive dust emission.

3.1.4 Receptors and Exposure Scenario

The Facility is part of a large manufacturing and industrial storage complex (Freeport Center) and is expected to remain as an industrial use area in the future. A chain-link fence restricts access to the Facility on a 24 hour basis. Facility access is limited by security protocols. The Facility and, more specifically, the SWMUs of interest, are paved or covered and do not contain subsurface structures (i.e., basements or crawlspaces where Facility visitors would work or enter into). Potential current and future human receptor populations include:

- Authorized visitors
- Ashland on-site workers
- Contract construction workers

The text below outlines the rationale for inclusion or exclusion of the potential receptors in the HHRA.

3.1.4.1 Potential Exposure to COCs in Soil and Groundwater

Industrial/Commercial Land Use Scenario: Authorized Visitors
Exposure is primarily limited to personnel working at the Facility and individuals permitted to enter the area. Risks to authorized visitors potentially exposed to soil or groundwater at the Facility would be less than those risks associated with on-site workers or construction workers because authorized visitors to the Facility would be present on a limited basis. In addition, visitors must wear appropriate personal protective equipment and follow the Facility's procedures regarding health and safety to mitigate the potential for exposure. In general, visitors would not be expected to come in contact with subsurface soils or groundwater at the SWMUs as groundwater is not utilized for potable or non-potable purposes and soils are covered or paved at

the Facility (i.e., the potential pathway is incomplete). Therefore, authorized visitors were not evaluated in the HHRA for the Facility.

Industrial/Commercial Land Use Scenario: Ashland On-site Workers

On-site workers are defined as current and future industrial/commercial employees who might be exposed to chemicals in surface soil or groundwater while performing non-intrusive, operational activities. Because SWMUs are generally covered by pavement and structures and groundwater at the SWMUs is not utilized for potable or non-potable purposes, exposure to surface soil and groundwater is considered incomplete. Workers are not involved in intrusive or subsurface activities. Therefore, there is no exposure to subsurface soil or groundwater (i.e., the potential pathway is incomplete). The on-site worker receptor was not quantitatively evaluated for the HHRA.

Industrial/Commercial Land Use Scenario: Contract Construction Workers

As indicated soils at the SWMUs are largely covered or paved and groundwater is not utilized for potable or non-potable purposes at the facility. Therefore, exposure to COCs in subsurface soil or groundwater would require subsurface intrusive or excavation activities for soils to be uncovered or groundwater to be encountered. It was conservatively assumed that construction activities could occur at the Facility and it is possible for construction workers to be exposed to COCs detected in subsurface soil and groundwater via incidental ingestion, inhalation, and dermal contact.

3.2 QUANTITATION OF CHEMICAL INTAKE

Integration of data gathered in the exposure assessment (i.e., the extent, frequency, and duration of exposure for the receptors) into a quantitative expression of chemical-specific intake is necessary to perform a quantitative HHRA.

The potential for human receptors to be exposed to COCs in environmental media through relevant routes of exposure (e.g., inhalation, ingestion and dermal contact) were evaluated. Exposure pathways considered not to be applicable, based on Facility-specific information, were excluded from the quantitative evaluation in the HHRA. Rationale for the elimination of exposure pathways are discussed in detail in Section 3.1.1 of the Phase I RFI Work Plan (URS Diamond, 2000) and summarized in Section 3.1.4 of this appendix.

Described below is the basic equation used to calculate the intake of COCs by human receptors (USEPA, 1989):

$$DI = \frac{C \times IR \times EF \times ED}{BW \times AT}$$

Where:

DI	=	Daily intake (mg of chemical per kg of body weight per day)
C	=	Concentration of a COC (e.g., mg/kg in soil, mg/L in water)
IR	=	Intake rate; the amount of impacted medium contacted over the exposure period (e.g., mg/day for soil, L/day for water and m^3/day for air)
EF	=	Exposure frequency; describes how often exposure occurs (days/year).
ED	=	Exposure duration; describes how long exposure occurs (years).

BW = Body weight; the average body weight over the exposure period (kg)
AT = Averaging time; period over which exposure is averaged (days)

Each of the intake variables in the above equation consists of a range of values in the literature. A reasonable maximum exposure (RME) scenario, which represents the maximum exposure that is reasonably likely to occur, was calculated using the 95% UCL concentrations of COCs and a combination of the mean and upper-bound exposure parameters over an appropriate exposure area.

4.0 TOXICITY ASSESSMENT

The toxicity assessment provides a framework for characterizing the relationship between the magnitude of exposure to a COC and the nature and likelihood of adverse health effects that may result from such exposure. In an HHRA, chemical toxicity is typically divided into two categories: carcinogenic and non-carcinogenic effects. Potential health effects are evaluated separately for these two categories, because their toxicity criteria are based on different mechanistic assumptions and associated risks are expressed in different units. Provided in this subsection is an overview of the methodology that was used to develop a toxicity assessment as part of the HHRA for the Facility.

4.1 SOURCES OF TOXICITY INFORMATION

Pertinent toxicological and dose-response information for COCs were selected from the following sources in order of preference, in accordance with USEPA guidance (USEPA, 2003):

- Tier 1 – Integrated Risk Information System (IRIS), available on-line (USEPA, 2005)
- Tier 2 – USEPA's Provisional Peer-Reviewed Toxicity Values (PPRTVs)
- Tier 3 – Other Toxicity Values (e.g., California Environmental Protection Agency, The Agency for Toxic Substances and Disease Registry, and USEPA's Health Effects Assessment Summary Tables [USEPA, 1997]).

4.2 METHODOLOGY FOR EVALUATING CARCINOGENIC EFFECTS

For purposes of assessing risks for potential carcinogens, USEPA has adopted the science policy position of "no-threshold," i.e., there is essentially no level of exposure to a carcinogen that will not result in some finite possibility of tumor formation. This approach requires the development of dose-response curves correlating risks associated with given levels of exposure. Linear dose-risk response curves are generally assumed.

Carcinogenic risks associated with a given level of exposure to potential carcinogens are typically extrapolated based on slope factors (SFs) or unit risks. SFs are the upper 95% confidence limit of the slope of the dose-response curve, expressed in terms of risk per unit dose (given in $[mg/kg\text{-}day]^{-1}$). Unit risks relate the risk of cancer development with the concentration of a carcinogen in the given environmental medium, expressed as either risk per unit concentration in air (given in $[\mu g/m^3]^{-1}$) or drinking water (given in $[\mu g/L]^{-1}$).

Current USEPA guidance for calculating a dermal SF is to adjust the oral SF with an oral absorption factor specific for that chemical. It should be noted that the oral absorption factor used in the calculation refers to absorption of the chemicals in the species upon which the SF is based; i.e., generally not absorption data in humans.

The equation for extrapolation of a default dermal SF is as follows:

$$\textit{Default Dermal SF}\left([mg/kg\text{-}day]^{-1}\right) = \textit{Oral SF}\left([mg/kg\text{-}day]^{-1}\right) \div \textit{Oral Absorption Factor}\,(\%)$$

4.3 METHODOLOGY FOR EVALUATING NON-CARCINOGENIC EFFECTS

The USEPA has adopted the science policy position that protective mechanisms (such as repair, detoxification, and compensation) must be overcome before the adverse systemic health effect is manifested. Therefore, a range of exposures exists from zero to some finite value that can be tolerated by the organism without appreciable risk of expressing adverse effects.

The approach used by the USEPA to gauge potential non-carcinogenic effects is to identify the upper boundary of the tolerance range (threshold) for each chemical and to derive an estimate of the exposure below which adverse health effects are not expected to occur. Such an estimate calculated for the oral route of exposure is an oral reference dose (RfD), and for the inhalation route of exposure is an inhalation reference concentration (RfC). The oral RfD is typically expressed as mg chemical per kg body weight per day (mg/kg-day), and the inhalation RfC is usually expressed in terms of concentration in the air (i.e., mg chemical per m^3 of air). However, for purposes of the Facility-specific HHRA, inhalation RfC values can be converted to units of dose by multiplying by the inhalation rate (20 m^3/day, an upper-bound estimate for combined indoor-outdoor activity) and dividing by the body weight (70 kg, average body weight), as detailed in the following equation:

$$\textit{Inhalation RfD}\,(\textit{mg/kg - day}) = \textit{RfC}\,(\textit{mg/m}^3) \times 20\ \textit{m}^3\textit{/day} \div 70\ \textit{kg}$$

Currently, two types of oral RfDs/inhalation RfCs are available from the USEPA, depending on the length of exposure being evaluated, chronic and subchronic. Chronic oral RfDs/inhalation RfCs are specifically developed to be protective for long-term exposure to a chemical, and are generally used to evaluate the non-carcinogenic effects associated with exposure periods between seven years (approximately 10 percent of a human lifetime) and lifetime. Subchronic oral RfDs/inhalation RfCs are useful for characterizing potential non-carcinogenic effects associated with shorter-term exposures. Current USEPA guideline requires that subchronic oral RfDs/inhalation RfCs be used to evaluate the potential non-carcinogenic effects of exposure periods between two weeks and seven years (USEPA, 1989).

Toxicological criteria specifically derived for gauging potential human health effects associated with the dermal route of exposure have not been developed by USEPA. For purposes of the HHRA, default dermal RfD values will be extrapolated from oral RfDs in accordance with the current USEPA guidance (USEPA, 1989), if:

- Health effects following exposure are not route-specific.
- Portal-of-entry effects (e.g., dermatitis associated with dermal exposure and respiratory effects associated with inhalation exposure) are not the principal effects of concern.

Exposures with the dermal route are generally calculated as absorbed doses, while oral RfDs are expressed as administered doses. Therefore, adjustments are necessary to match the dermal exposure estimates with the oral RfDs. Current USEPA guidance is to adjust the oral RfD with oral absorption factor (i.e., percent chemical that is absorbed) to extrapolate a default dermal RfD (USEPA, 1989; USEPA 2004a). It should be noted that the oral absorption factor used in the calculation refers to absorption of the chemicals in the species upon which the reference dose is based; (i.e., generally not absorption data in humans).

The equation for extrapolation of a default RfD is as follows:

$$\textit{Dermal RfD}\,(\textit{mg/kg - day}) = \textit{Oral RfD}\,(\textit{mg/kg - day}) \times \textit{Oral Absorption Factor}\,(\%)$$

5.0 RISK CHARACTERIZATION

In this step of the HHRA, information obtained from the exposure and toxicity assessments were integrated to characterize the potential risks posed by COCs selected for the HHRA.

5.1 RISK FOR INDIVIDUAL COCs

The methods that were used for characterizing risk potentially associated with exposure to individual COCs are briefly outlined as follows:

5.1.1 Carcinogenic Effects

Potential risks for carcinogenic effects are typically estimated by calculating incremental lifetime cancer risk (CR) as a result of exposure to carcinogens. Calculation of a CR for an exposure pathway involves multiplying the chronic daily intake for each chemical by its upper-bound cancer slope factor, as described by the following equation (USEPA, 1989):

$$CR = CDI \times SF$$

Where:

CR	=	Cancer risk (unitless).
CDI	=	Chronic daily intake of chemicals (expressed in mg/kg-day);
SF	=	Slope factor (expressed in $[mg/kg\text{-}day]^{-1}$); Chemical-specific SF values were used in the calculation if available, values extrapolated from a surrogate were used, if appropriate.

For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper-bound lifetime CR to an individual of between one in ten thousand (10^{-4}) and one in a million (10^{-6}).

5.1.2 Noncarcinogenic Effects

Potential risks for noncarcinogenic effects are typically estimated by calculating the hazard quotient (HQ) for each COC, using the following equation:

$$HQ = \frac{CDI}{RfD}$$

Where:

HQ	=	Hazard quotient (unitless).
CDI	=	Chronic daily intake of chemicals (expressed in mg/kg-day).
RfD	=	Reference dose (expressed in mg/kg-day); chemical-specific RfD values will be used in the calculation if available, values extrapolated from a surrogate will be used, if appropriate.

5.2 RISK FOR CUMULATIVE COCs

The methodology used for characterizing potential risk for exposures to multiple chemicals is briefly outlined as follows:

1. Organize outputs of exposure and toxicity assessments by the duration and route of exposure for each receptor population.

   The total upper-bound excess lifetime CRs and the HQs were tabulated separately for each COC.

2. Quantify total carcinogenic and noncarcinogenic risks for each pathway by summing the risks estimated for each COC.

   The total upper-bound excess lifetime CR for each pathway was obtained by summing CRs calculated for individual COCs. For known or suspected carcinogens, exposure levels that represent an excess upper-bound lifetime cancer risk to an individual greater than 10^{-6} are addressed as outlined in Section 1.2 of this appendix and the Hazardous Waste Permit for the Facility (UDEQ, 1997).

   The sum of the HQs of all COCs under consideration is termed the HI. The HI is a useful reference point for gauging the potential noncarcinogenic effects of environmental exposures to complex exposures. In general, an HI that is less than or equal to one is regarded as not likely to be associated with any health risks, and is, therefore, less likely to be of regulatory concern as compared to hazard indices greater than one. However, a conclusion should not be categorically drawn that all HI's greater than one are "unacceptable" because of the following reasons:

   ⇒ There is perhaps one order of magnitude or greater uncertainty inherent in estimates of oral RfDs and inhalation RfCs due to the conservative approach used to derive these estimates.

   ⇒ There are uncertainties related to the assumption that individual HQ's are additive.

   Therefore, if the HI exceeds one, the HI will be re-calculated by segregating the chemicals into subgroups based on the target organs affected and the mechanism of action. However, for this HHRA this step was unnecessary because the HI is considerably less than 1.

3. Estimate overall risks that affect each population over the same time period by combining risks across pathways.

   Risks were combined across different pathways that are likely to affect the same population over the same time periods to address the possibility of a population that is exposed to more than one pathway.

Table D-6 to D-8 present the risk calculations for the construction worker potentially exposed to B(a)P and D(a,h)A in soil, PCE in soil, and PCE in groundwater, respectively.

6.0 UNCERTAINTY ANALYSIS

The objective of conducting an uncertainty analysis is to evaluate the assumptions and uncertainties inherent in the HHRA to place the results of the risk estimate in proper perspective. Presented below are the types of uncertainties that were evaluated in the HHRA report.

6.1 DATA EVALUATION

Uncertainties associated with the data validation process are discussed to identify key issues, if any, that contribute most to the overall quality of the analytical data evaluated in the HHRA.

The QA/QC review (Appendix B) indicated that the data are acceptable for the purpose of evaluating potential impacts of tetrachloroethene in soil and groundwater at this site.

6.2 EXPOSURE ASSESSMENT

Uncertainties associated with the findings of the exposure assessment may result from several sources. For this Facility, exposure assessment uncertainties include:

- Groundwater samples were collected as grab samples. Therefore, the concentrations of chemicals in these samples are expected to be higher than concentrations found in developed monitoring wells. The use of grab sample data is likely to result in an overestimate of risks potentially posed by PCE in groundwater.
- The use of the maximum detected concentration of PCE in groundwater to estimate construction worker risk. This is a conservative approach because the concentration of groundwater construction workers might contact could be significantly lower than the maximum concentration because PCE was a COC for SWMU 7 only. It was nondetect or present at low levels at the remaining Facility SWMUs.
- Conservative assumptions regarding exposure scenarios (e.g., land use, exposed populations, activity patterns) for the construction worker exposed to groundwater. The Soil and Water Management Plan (SWMP) implemented by Ashland for the Facility defines the required work practices to be used to minimize exposure if groundwater is encountered during excavation activities. Although the SWMP ensures that construction workers would not contact groundwater, this pathway was quantified for an informational purpose.
- Applicability and assumptions of models selected to predict the fate and transport of COCs in the environment. For this HHRA, it was conservatively assumed that chemicals present in soil and groundwater did not undergo biodegradation and natural attenuation.
- Exposure parameters for estimating intake of COCs in soil and groundwater were mostly default values recommended by USEPA and most likely overestimate the actual exposures for construction workers at the site.

6.3 TOXICITY ASSESSMENT

The following sources of uncertainties associated with the results of a toxicity assessment:

- Uncertainty inherent in the standard risk evaluation process, e.g., the default approach for deriving dermal toxicity criteria. Currently there are no toxicity values available to evaluate the dermal exposure pathway. Therefore, oral RfDs and oral SFs are used to assess systemic toxicity from dermal exposures. When oral toxicity values for systemic effects are applied to dermal exposures, uncertainty in the risk assessment is introduced because differences in the mechanisms of action between the oral and dermal exposures are not taken into account. Use of oral toxicity factors can result in the over- or underestimation of risk, depending on the chemical. It is not possible to make a general statement about the direction or magnitude of this uncertainty.
- Uncertainty common to current agency guidance on the risk evaluation, e.g., the use of animal data to extrapolate toxicity values necessary for estimating risk for human receptors.

6.4 RISK CHARACTERIZATION

Level of confidence in the results of the risk characterization were analyzed in light of uncertainties associated with the data validation, exposure assessment and toxicity assessment in an attempt to identify the following:

- Major COCs and pathways driving the risks
- Major factors that may reduce the uncertainty associated with the results of the risk characterization

The overall confidence of the conclusions made for this Facility-specific HHRA is high because the approach used to select EPCs, exposure pathways, and exposure parameters used to estimate risk and hazard are inherently conservative and are not likely to underestimate risk to receptors potentially exposed to chemicals in soil and groundwater at the Facility.

7.0 REFERENCES

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Table D-1a
Analytical Data Used for Human Health Risk Assessment
All Soil Depths
Ashland – Clearfield, Utah

		Tetrachloroethene		Benzo(a)pyrene	Dibenz(a,h)anthracene
Sample ID	Sample Depth (feet)	Result[a] (ug/kg)		Result[a] (ug/kg)	Result[a] (ug/kg)
BH001	4.5'-6'	2.8	U	NS	NS
BH002	4'-5'	100	J	NS	NS
BH003	2'-4'	2.7	U	NS	NS
BH003	6'	4.75	U	NS	NS
BH004	2.5'-4.5'	3.05	U	NS	NS
BH005	5'-6'	300		NS	NS
BH006	2.5'-3.5'	2.95	U	NS	NS
BH007/D	3.5'-4.5'	3.95	J	165 U	165 U
BH008	3.5'-4.5'	3.05	U	930	370
BH009	3'-4'	1.9	J	165 U	165 U
BH010	4'-6'	53	J	200 U	200 U
BH011	6'-7'	3	U	NS	NS
BH012	6'-7.5'	3.05	U	NS	NS
BH012	9'	3.05	U	NS	NS
BH013	3.5'-4'	5.8		NS	NS
BH013	12'	290	J	NS	NS
BH014	4'-5'	3.1	U	NS	NS
BH015	5'-6'			NS	NS
BH016	3.5'	200	J	NS	NS
BH016	8'	4	U	NS	NS
BH-A	1'-2'	0.28	J	NS	NS
BH-A	5'-6'	0.1	U	NS	NS
BH-B	1'-2'	0.2	J	NS	NS
BH-B	5'-6'	0.105	U	NS	NS
BH-C	11'-12'	16.5	U	NS	NS
BH-D	11'-12'	16.5	U	NS	NS
BH002	4'-5'	0.105	U	NS	NS
BH002	7'-8'	0.105	U	NS	NS
BH-9A	5'-6'	0.1	U	NS	NS

Average Detected Concentration	95.5	930	370
Minimum Detected Concentration	0.2	930	370
Maximum Detected Concentration	300	930	370
Number of Samples Analyzed	28	4	4
Number of Detections	10	1	1
Percentage of Samples with no PCE Detections	64	75	75

Notes:

All concentration units are micrograms per kilogram (ug/kg).

[a] Results presented included detected results and one half the sample quantitation limit for nondetect results.

NS – Not sampled.

U – Chemical not detected

J – Estimated result

Table D-1b
Analytical Data Summary for Tetrachloroethene, Benzo(a)pyrene, and Dibenz(a,h)anthracene in Soil
Ashland – Clearfield, Utah

Chemical	Frequency of Detection	Detected Concentration		Average	Calculated[a] UCL Concentration	UCL Basis	Exposure Point Concentration	Rationale for Selection
		Minimum	Maximum					
Volatile Organic Compounds (µg/kg)								
Tetrachloroethene	10 / 28	0.2	300	95.5	194	99% Chebyshev (Mean, Sd) UCL	194	UCL less than maximum detected concentration.
Semivolatile Organic Compounds (µg/kg)								
Benzo(a)pyrene	1 / 4	930	930	930	1187	95% Chebyshev (Mean, Sd) UCL	930	Maximum detected concentration less than UCL.
Dibenz(ah)anthracene	1 / 4	370	370	370	429	Approximate Gamma UCL	370	Maximum detected concentration less than UCL.

Notes:

[a] Upper confidence limit (UCL) concentrations calculated using USEPA's ProUCL software (USEPA, 2003).

Table D-2
Tetrachloroethene ProUCL Output
Ashland – Clearfield, Utah

Raw Statistics	
Number of Valid Samples	28
Number of Unique Samples	21
Minimum	0.1
Maximum	300
Mean	36.576607
Median	3.05
Standard Deviation	83.923464
Variance	7043.1478
Coefficient of Variation	2.2944573
Skewness	2.5851742

Gamma Statistics	
k hat	0.2873548
k star (bias corrected)	0.2803763
Theta hat	127.28728
Theta star	130.45542
nu hat	16.091868
nu star	15.701072
Approx.Chi Square Value (.05)	7.7504717
Adjusted Level of Significance	0.0404
Adjusted Chi Square Value	7.4056566

Log-transformed Statistics	
Minimum of log data	-2.302585
Maximum of log data	5.7037825
Mean of log data	1.1827974
Standard Deviation of log data	2.4093895
Variance of log data	5.8051578

RECOMMENDATION
Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.4848975
Shapiro-Wilk 5% Critical Value	0.924
Data not normal at 5% significance level	
95% UCL (Assuming Normal Distribution)	
Student's-t UCL	63.590832

Gamma Distribution Test	
A-D Test Statistic	2.3616212
A-D 5% Critical Value	0.8596734
K-S Test Statistic	0.2969121
K-S 5% Critical Value	0.1799791
Data do not follow gamma distribution at 5% significance level	
95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	74.097678
Adjusted Gamma UCL	77.547743

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.8995045
Shapiro-Wilk 5% Critical Value	0.924
Data not lognormal at 5% significance level	
95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	494.25233
95% Chebyshev (MVUE) UCL	158.23311
97.5% Chebyshev (MVUE) UCL	208.09421
99% Chebyshev (MVUE) UCL	306.03669

95% Non-parametric UCLs	
CLT UCL	62.664058
Adj-CLT UCL (Adjusted for skewness)	70.943396
Mod-t UCL (Adjusted for skewness)	64.882241
Jackknife UCL	63.590832
Standard Bootstrap UCL	62.344457
Bootstrap-t UCL	84.527194
Hall's Bootstrap UCL	64.13469
Percentile Bootstrap UCL	63.687857
BCA Bootstrap UCL	72.528393
95% Chebyshev (Mean, Sd) UCL	105.70894
97.5% Chebyshev (Mean, Sd) UCL	135.62255
99% Chebyshev (Mean, Sd) UCL	***194.38205***

Incorporates averaging of results at BH007/FD

Table D-3
Benzo(a)pyrene ProUCL Output
Ashland – Clearfield, Utah

Raw Statistics	
Number of Valid Samples	4
Number of Unique Samples	3
Minimum	165
Maximum	930
Mean	365
Median	182.5
Standard Deviation	377.02785
Variance	142150
Coefficient of Variation	1.032953
Skewness	1.9886366

Gamma Statistics	
k hat	1.7427361
k star (bias corrected)	0.6023507
Theta hat	209.44077
Theta star	605.95929
nu hat	13.941889
nu star	4.8188056
Approx.Chi Square Value (.05)	1.0690284
Adjusted Level of Significance	N/A
Adjusted Chi Square Value	N/A

Log-transformed Statistics	
Minimum of log data	5.1059455
Maximum of log data	6.8351846
Mean of log data	5.5863482
Standard Deviation of log data	0.8374819
Variance of log data	0.7013759

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.6626208
Shapiro-Wilk 5% Critical Value	0.748
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	808.64175

Gamma Distribution Test	
A-D Test Statistic	0.8078102
A-D 5% Critical Value	0.6614864
K-S Test Statistic	0.4260894
K-S 5% Critical Value	0.3987181
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1645.2921
Adjusted Gamma UCL	N/A

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.7080604
Shapiro-Wilk 5% Critical Value	0.748
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	14714.303
95% Chebyshev (MVUE) UCL	936.28527
97.5% Chebyshev (MVUE) UCL	1193.1428
99% Chebyshev (MVUE) UCL	1697.6898

95% Non-parametric UCLs	
CLT UCL	675.07781
Adj-CLT UCL (Adjusted for skewness)	875.36321
Mod-t UCL (Adjusted for skewness)	839.88222
Jackknife UCL	808.64175
Standard Bootstrap UCL	N/R
Bootstrap-t UCL	N/R
Hall's Bootstrap UCL	N/R
Percentile Bootstrap UCL	N/R
BCA Bootstrap UCL	N/R
95% Chebyshev (Mean, Sd) UCL	***1186.7131***
97.5% Chebyshev (Mean, Sd) UCL	1542.2691
99% Chebyshev (Mean, Sd) UCL	2240.6899

RECOMMENDATION
Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Recommended UCL exceeds the maximum observation

Incorporates averaging of results at BH007/FD

Table D-4
Dibenz(a,h)anthracene ProUCL Output
Ashland – Clearfield, Utah

Raw Statistics	
Number of Valid Samples	4
Number of Unique Samples	3
Minimum	165
Maximum	370
Mean	225
Median	182.5
Standard Deviation	98.064605
Variance	9616.6667
Coefficient of Variation	0.4358427
Skewness	1.8387058

Gamma Statistics	
k hat	8.4726633
k star (bias corrected)	2.2848325
Theta hat	26.555995
Theta star	98.475491
nu hat	67.781306
nu star	18.27866
Approx.Chi Square Value (.05)	9.5911591
Adjusted Level of Significance	N/A
Adjusted Chi Square Value	N/A

Log-transformed Statistics	
Minimum of log data	5.1059455
Maximum of log data	5.913503
Mean of log data	5.3559278
Standard Deviation of log data	0.3826188
Variance of log data	0.1463971

RECOMMENDATION
Data follow gamma distribution (0.05)

Use Approximate Gamma UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.7464209
Shapiro-Wilk 5% Critical Value	0.748
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	340.39082

Gamma Distribution Test	
A-D Test Statistic	0.6126482
A-D 5% Critical Value	0.6576896
K-S Test Statistic	0.3371946
K-S 5% Critical Value	0.3952232
Data follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	***428.80099***
Adjusted Gamma UCL	N/A

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.7851261
Shapiro-Wilk 5% Critical Value	0.748
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	528.30656
95% Chebyshev (MVUE) UCL	408.17757
97.5% Chebyshev (MVUE) UCL	488.0079
99% Chebyshev (MVUE) UCL	644.81912

95% Non-parametric UCLs	
CLT UCL	305.65096
Adj-CLT UCL (Adjusted for skewness)	353.81745
Mod-t UCL (Adjusted for skewness)	347.90382
Jackknife UCL	340.39082
Standard Bootstrap UCL	N/R
Bootstrap-t UCL	N/R
Hall's Bootstrap UCL	N/R
Percentile Bootstrap UCL	N/R
BCA Bootstrap UCL	N/R
95% Chebyshev (Mean, Sd) UCL	438.72685
97.5% Chebyshev (Mean, Sd) UCL	531.20663
99% Chebyshev (Mean, Sd) UCL	712.86525

Recommended UCL exceeds the maximum observation

Incorporates averaging of results at BH007/FD

Table D-5a
Toxicity Value Summary
Ashland – Clearfield, Utah

Chemical	CAS	RfDo-C	Source	RfDo-S	Source	RfDi-C	Source	RfDi-S	Source	SFo	Source	SFi	Source	WOE	Source
Tetrachloroethene	127184	1E-02	IRIS	1E-01	HEAST	1.71E-01	NCEA	NV	–	5.2E-02	NCEA	2.03E-03	NCEA	NA	IRIS
Benzo(a)pyrene	50328	NV	–	NV	–	NV	–	NV	–	7.3E+00	IRIS	3.08E+00	NCEA	B2	IRIS
Dibenzo(a,h)anthracene	53703	NV	–	NV	–	NV	–	NV	–	7.3E+00	IRIS	NV	–	B2	IRIS

RfDo-C – Chronic oral reference dose (mg/kg-day)
RfDo-S – Subchronic oral reference dose (mg/kg-day)
RfDi-C – Chronic inhalation reference dose (mg/kg-day)
RfDi-S – Subchronic inhalation reference dose (mg/kg-day)
SFo – Oral slope factor $(mg/kg\text{-}day)^{-1}$
SFi – Inhalation slope factor $(mg/kg\text{-}day)^{-1}$
WOE – Weight of evidence for carcinogenicity
IRIS – Integrated Risk Information System (on-line database)
NCEA – National Center for Environmental Assessment
HEAST – Health Effects Assessment Summary Tables
NA – Not applicable
NV – No value available
B2 – Probable human carcinogen

Table D-5b
Chemical/Physical Parameter Summary
Ashland – Clearfield, Utah

Chemical	CAS No	ABSd		GIABS		Di		Dw		Kd		H'	
Tetrachloroethene	127184	NA	EPA, 2004a	1.00E+00	EPA, 2004a	7.20E-02	EPA, 2002a	8.20E-06	EPA, 2002a	6.41E-01	EPA, 2002a	7.24E-01	EPA, 2002a
Benzo(a)pyrene	50328	1.30E-01	EPA, 2004a	1.00E+00	EPA, 2004a	4.30E-02	EPA, 2002a	9.00E-06	EPA, 2002a	4.72E+03	EPA, 2002a	1.87E-05	EPA, 2002a
Dibenzo(a,h)anthracene	53703	1.30E-01	EPA, 2004a	1.00E+00	EPA, 2004a	2.02E-02	EPA, 2002a	5.18E-06	EPA, 2002a	1.57E+04	EPA, 2002a	5.03E-06	EPA, 2002a

ABSd – Dermal absorption factor (unitless)
GIABS – Gastrointestinal absorption value (unitless)
Di – Diffusivity in air (cm^2/s)
Dw – Diffusivity in water (cm^2/s)
Kd – Soil-water partition coefficient (cm^3/g)
H' – Dimensionless Henry's law constant
EPA – United States Environmental Protection Agency

Table D-6.1
Construction Worker: Soil Pathway Exposure Parameter Values
Ashland – Clearfield, Utah

Exposure Pathway	Parameter	Construction Worker		
		Description	RME	Source
Incidental Soil Ingestion	SIR	Soil Ingestion Rate (mg/day)	330	(a)
	EF	Exposure Frequency (days/year)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	FI	Fraction Ingested (unitless)	1	(b)
	BW	Body Weight (kg)	70	(d,e,f)
	ATc	Averaging Time for Carcinogens (days) (h)	25,550	(d,e,f)
Dermal Contact with Soil	SA	Skin Surface Area Exposed (cm^2)	3,300	(g)
	SSAF	Soil-to-Skin Adherence Factor (mg/cm^2)	0.3	(h)
	CF	Conversion Factor (kg/mg)	1E-06	–
	EF	Exposure Frequency (day/year)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	EV	Event Frequency (events/day)	1	(h)
	BW	Body Weight (kg)	70	(d,e,f)
	ATc	Averaging Time for Carcinogens (days) (h)	25,550	(d,e,f)
Inhalation of Derived Chemicals	IR	Inhalation Rate (m^3/day)	20	(i)
	EF	Exposure Frequency (day/year)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	BW	Body Weight (kg)	70	(d,e,f)
	ATc	Averaging Time for Carcinogens (days) (h)	25,550	(d,e,f)

Notes:
RME - Reasonable Maximum Exposure.
(a) U.S. EPA. 2002. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.* Exhibit 1-2.
(b) Conservative assumption based on the industrial land use.
(c) Construction activities are assumed to occur over a 1 year period.
(d) U.S. EPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors.*
(e) U.S. EPA, 1989. *RAGS, Volume I, Human Health Evaluation Manual (Part A).*
(f) 70 kg body weight and 70 year lifetime are used to be consistent with the development of cancer slope factors.
(g) U.S. EPA, 2004. *RAGS, Volume 1, Human Health Evaluation Manual (Part E),* Exhibit 3-5.
(h) U.S. EPA, 2004. *RAGS, Volume 1, Human Health Evaluation Manual (Part E),* Exhibit 3-2.
(i) U.S. EPA, 1997. *Exposure Factors Handbook, Volume I,* Table 5-23. Short-term exposures for outdoor workers, heavy activity.

Table D-6.2a
Risk Calculations
Construction Worker: Incidental Ingestion of Soil Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Ing-Risk} = \frac{(\text{Csoil} \times \text{SFo} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{SIR} \times \text{FI})}{(\text{BW} \times \text{ATc})}$$

Equation	Ing - Risk	= (	Csoil	×	SFo	×	CF	×	EF	×	ED	×	SIR	×	FI	) ÷ (	BW	×	ATc	)
Units	unitless		mg/kg		kg-day/mg		kg/mg		days/year		years		mg/day		unitless		kg		days	
Benzo(a)pyrene	3E-08	= (	9.30E-01	×	7.30E+00	×	1E-06	×	20	×	1	×	330	×	1	) ÷ (	70	×	25550	)
Dibenzo(a,h)anthracene	9E-09	= (	3.25E-01	×	7.30E+00	×	1E-06	×	20	×	1	×	330	×	1	) ÷ (	70	×	25550	)

Notes:

Ing - Risk – Ingestion risk
Csoil – Concentration in soil
SFo – Oral Slope Factor.
CF – Unit Conversion Factor
EF – Exposure Frequency
ED – Exposure Duration
SIR – Soil Ingestion Rate
FI – Fraction Ingested from Contaminated Source
BW – Body Weight
ATc – Averaging Time for Carcinogens

Table D-6.2b
Risk Calculations
Construction Worker: Incidental Ingestion of Soil Pathway – Noncarcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Ing - HQ} = \frac{(\text{Csoil} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{SIR} \times \text{FI})}{(\text{BW} \times \text{ATn} \times \text{RfDo})}$$

Equation	Ing - HQ	= (	Csoil	×	CF	×	EF	×	ED	×	SIR	×	FI	) ÷ (	BW	×	ATn	×	RfDo	)
Units	unitless		mg/kg		kg/mg		days/year		years		mg/day		unitless		kg		days		mg/kg-day	
Benzo(a)pyrene	NA	= (	9.30E-01	×	1E-06	×	20	×	1	×	330	×	1	) ÷ (	70	×	365	×	NV	)
Dibenzo(a,h)anthracene	NA	= (	3.25E-01	×	1E-06	×	20	×	1	×	330	×	1	) ÷ (	70	×	365	×	NV	)

Notes:

Ing - HQ – Ingestion Hazard
Csoil – Concentration in Soil
EF – Exposure Frequency
ED – Exposure Duration
SIR – Soil Ingestion Rate
FI – Fraction Ingested from Contaminated Source
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
RfDo – Oral reference dose
NV – No toxicity value available for this pathway.
NA – Not Applicable

Table D-6.3a
Risk Calculations
Construction Worker: Incidental Dermal Contact with Soil Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Derm - Risk} = \frac{(\text{Csoil} \times \text{SFabs} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{EV} \times \text{SA} \times \text{SSAF} \times \text{ABSd})}{(\text{BW} \times \text{ATc})}$$

Equation	Derm - Risk = (	Csoil	×	SFabs	×	CF	×	EF	×	ED	×	EV	×	SA	×	SSAF	×	ABSd	) ÷ (	BW	×	ATc	)
Units	unitless	mg/kg		kg-day/mg		kg/mg		days/year		years		events/day		cm²		mg/cm²-event		unitless		kg		days	
Benzo(a)pyrene	9.8E-09	= (9.30E-01	×	7.30E+00	×	1E-06	×	20	×	1	×	1	×	3,300	×	0.3	×	1.30E-01	) ÷ (	70	×	25,550	)
Dibenzo(a,h)anthracene	3.4E-09	= (3.25E-01	×	7.30E+00	×	1E-06	×	20	×	1	×	1	×	3,300	×	0.3	×	1.30E-01	) ÷ (	70	×	25,550	)

Notes:

Derm - Risk – Dermal Risk
Csoil – Concentration in Soil
SFabs – Absorbed slope factor (SFo ÷ ABSgi)
CF – Conversion factor
EF – Exposure Frequency
ED – Exposure Duration
EV – Event Frequency
SA – Skin Surface Area
SSAF – Soil-to-skin Adherence Factor
ABSd – Dermal Soil Absorption Factor
BW – Body Weight
ATc – Averaging Time for Carcinogens
NA – Not Applicable

Table D-6.3b
Risk Calculations
Construction Worker: Incidental Dermal Contact with Soil Pathway – Noncarcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Derm - HQ} = \frac{(\text{Csoil} \times \text{EF} \times \text{EF} \times \text{ED} \times \text{EV} \times \text{SA} \times \text{SSAF} \times \text{ABSd})}{(\text{BW} \times \text{ATn} \times \text{RfDabs})}$$

Equation	Derm - HQ	= (	Csoil	×	CF	×	EF	×	ED	×	EV	×	SA	×	SSAF	×	ABSd	) ÷ (	BW	×	ATn	×	RfDabs	)
Units	unitless		mg/kg		kg/mg		days/year		years		events/day		cm²		mg/cm²-event		unitless		kg		days		mg/kg-day	
Benzo(a)pyrene	NA	= (	9.30E-01	×	1E-06	×	20	×	1	×	1	×	3,300	×	0.3	×	1.30E-01	) ÷ (	70	×	365	×	NA	)
Dibenzo(a,h)anthracene	NA	= (	3.25E-01	×	1E-06	×	20	×	1	×	1	×	3,300	×	0.3	×	1.30E-01	) ÷ (	70	×	365	×	NA	)

Notes:

Derm - HQ – Dermal Hazard Quotient
Csoil – Concentration in Soil
EF – Exposure Frequency
ED – Exposure Duration
EV – Event Frequency
SA – Skin Surface Area
SSAF – Soil-to-skin Adherence Factor
ABSd – Dermal Soil Absorption Factor
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
RfDabs – Absorbed reference dose (RfDo ×ABSgi)
NA – Not Applicable

Table D-6.4a
Risk Calculations
Construction Worker: Incidental Inhalation of Soil (Fugitive Emissions and Volatile Compounds) Pathway– Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Inh - Risk} = \frac{(\text{Csoil} \times \text{SFi} \times \text{IR} \times \text{EF} \times \text{ED} \times [(1/\text{VF}) + (1/\text{PEF})])}{(\text{BW} \times \text{ATc})}$$

Equation	Inh - Risk	= (	Csoil	×	SFi	×	IR	×	EF	×	ED	×	[	1	/	VF	+	1	/	PEF	]	)	÷	(	BW	×	ATc	)
Units	unitless		mg/kg		kg-day/mg		m³/day		days/year		year					m³/kg				m³/kg					kg		days	
Benzo(a)pyrene	1.13E-11	= (	9.30E-01	×	3.08E+00	×	20	×	20	×	1	×	[	1	/	NA	+	1	/	5.67E+07	]	)	÷	(	70	×	25,550	)
Dibenzo(a,h)anthracene	NA	= (	3.25E-01	×	NV	×	20	×	20	×	1	×	[	1	/	NA	+	1	/	5.67E+07	]	)	÷	(	70	×	25,550	)

Notes:

Inh - Risk – Inhalation Risk
Csoil – Concentration in Soil
SFi – Inhalation Slope Factor
IR – Inhalation Rate
EF – Exposure frequency
ED – Exposure duration
VF – Volatilization Factor
PEF – Particulate Emission Factor
BW – Body Weight
ATc – Averaging Time for Carcinogens
NV – No toxicity value available for this pathway.

Table D-6.4b
Risk Calculations
Construction Worker: Incidental Inhalation of Soil (Fugitive Emissions and Volatile Compounds) Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Inh - HQ} = \frac{(\text{Csoil} \times \text{IR} \times \text{EF} \times \text{ED} \times ([1/\text{VF}] + [1/\text{PEF}]))}{(\text{BW} \times \text{ATn} \times \text{RfDi})}$$

Equation	Inh - HQ	= (	Csoil	×	IR	×	EF	×	ED	× [	1	/	VF	+	1	/	PEF	] ÷ (	BW	×	ATn	×	RfDi	)
Units	unitless		mg/kg		m³/day		days/year		year				m³/kg				m³/kg		kg		days		mg/kg-day	
Benzo(a)pyrene	NA	= (	9.30E-01	×	20	×	20	×	1	× [	1	/	NA	+	1	/	5.67E+07	] ÷ (	70	×	365	×	1.30E-01	)
Dibenzo(a,h)anthracene	NA	= (	3.25E-01	×	20	×	20	×	1	× [	1	/	NA	+	1	/	5.67E+07	] ÷ (	70	×	365	×	1.30E-01	)

Notes:

Inh - Risk – Inhalation Hazard Quotient
Csoil – Concentration in Soil
IR – Inhalation Rate
EF – Exposure frequency
ED – Exposure duration
VF – Volatilization Factor
PEF – Particulate Emission Factor
RfDi – Inhalation Reference Dose
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
NV – No toxicity value available for this pathway.
NA – Not Applicable

Table D-6.4c
Construction Worker: Particulate Emission Factor Calculations
Ashland – Clearfield, Utah

$$PEF_{sc} = Q/C_{sr} \times \frac{1}{F_D} \times \left[\frac{T \times A_g}{556 \times \left(\frac{w}{3}\right) \times p \times \Sigma VKT} \right]$$

PEF_{sc} – Subchronic road particulate emission factor

Q/C_{sr} – Inverse of a 1-hour average air concentrations along a straight road segment

F_D – Dispersion correction factor (unitless)

T – Total time over which construction occurs (in seconds), 960 hrs x 60 min/hr x 60 sec/min = 3.46E+06 sec

A_R – Surface area of contaminated road segment (m^2)

0.826443 acres x (4,048 m^2/acre) = 3345.44 m^2. The square root of 3345.44 m^2 is 57.84 m
Assuming the road is 57.84 m (189.76 ft) long and 16 ft wide

$A_R = L_R \times W_R \times 0.092903\ m^2/ft^2$

W – Mean vehicle weight, where:

W = 40 tons

p – Percentage of days with at least 0.01 inches of precipitation, minimum of 80 days/yr for Salt Lake City, based on Exhibit 5-2 (70/365 = 0.19).

ΣVKT – Sum of fleet vehicle traveled during the exposure duration (kilometers), assuming all trucks travel once a day, where:

ΣVKT = 1 vehicles x 1.4 km/day x (2 wks/yr ÷ 2) x 5 days/wk
= 7

Equation	PEF_{sc}	=	Q/C_{sr}	× [1 ÷	F_D	] × { (	T	×	A_R	) ÷ [	556	× (	W	/ 3) $^{0.4}$	×	*p*	× ΣVKT] }
Units	m^3/kg		g/m^2-s per kg/m^3		unitless		s		m^2				tons				km
All Chemicals	5.67E+07	=	23.02	× [1 ÷	0.19	] × { (	3.46E+06	×	2.82E+02	) ÷ [	556	× (	40	/ 3) $^{0.4}$	×	0.19	× 7] }

Default values are as presented in Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA 2002a).

CALCULATION OF SURFACE AREA OF CONTAMINATED ROAD SEGMENTS (A_R)

A_R	=	L_R	×	W_R	×	0.092903
m^2		ft		ft		m^2/ft^2
2.82E+02	=	189.76	×	16	×	0.092903

where:

A_R = Surface area of contaminated road segment (m^2)

L_R = Length of road segment (ft)

L_R = square root of site surface contamination (0.826443 acres)

= (4,048 m^2/acre x 0.826443 acres = (3345.44 m^2)$^{1/2}$ = 57.84 m = 1.89.76 ft

W_R = Width of road segment (ft)

Table D-6.4d
Construction Worker: Dispersion Correction Factor Calculations
Ashland – Clearfield, Utah

Equation:

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9.6318}{t_c^2}$$

F_D = Dispersion correction factor (unitless)
t_c = Duration of construction (hr), estimated using the following equation:
t_c = (8 hrs/workday) × (20 workdays/month) × 6 months = 960 hrs

F_D	=	0.1852	+ (	5.3537	÷	t_c hours	) + ((	- 9.6318	) ÷ (	t_c hours	) ^{2})
0.19	=	0.1852	+ (	5.3537	÷	960	) + ((	- 9.6318	) ÷ (	960	) ^{2})

Table D-6.5
Chemicals in Surface and Surface and Subsurface Soil
Risk and Hazard Summary
Construction Worker
Ashland – Clearfield, Utah

	Carcinogenic Risk							Noncarcinogenic Hazard							
Equation Units	CR unitless	=	Ingestion unitless	+	Dermal unitless	+	Inahalation unitless	HQ unitless	=	Ingestion unitless	+	Dermal unitless	+	Inahalation unitless
Benzo(a)pyrene	3E-08	=	2.51E-08	+	9.77E-09	+	1.13E-11	NA	=	NA	+	NA	+	NA
Dibenzo(a,h)anthracene	1E-08	=	8.76E-09	+	3.42E-09	+	NA	NA	=	NA	+	NA	+	NA
Soil CR	**5E-08**	=	3.38E-08	+	1.32E-08	+	NA	**Soil HI**	NA	=	NA	+	NA	+	NA

Notes:

NA – Not Applicable
CR – Cancer Risk
HQ – Hazard Quotient
HI – Hazard Index

Table D-7.1
Construction Worker: Soil Pathway Exposure Parameter Values
Ashland – Clearfield, Utah

Exposure Pathway	Parameter	Construction Worker		
		Description	RME	Source
Incidental Soil Ingestion	SIR	Soil Ingestion Rate (mg/day)	330	(a)
	EF	Exposure Frequency (days/year)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	FI	Fraction Ingested (unitless)	1	(b)
	BW	Body Weight (kg)	70	(d,e,f)
	ATc	Averaging Time for Carcinogens (days) (h)	25,550	(d,e,f)
Dermal Contact with Soil	SA	Skin Surface Area Exposed (cm^2)	3,300	(g)
	SSAF	Soil-to-Skin Adherence Factor (mg/cm^2)	0.3	(h)
	CF	Conversion Factor (kg/mg)	1E-06	–
	EF	Exposure Frequency (day/year)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	EV	Event Frequency (events/day)	1	(h)
	BW	Body Weight (kg)	70	(d,e,f)
	ATc	Averaging Time for Carcinogens (days) (h)	25,550	(d,e,f)
Inhalation of Derived Chemicals	IR	Inhalation Rate (m^3/day)	20	(i)
	EF	Exposure Frequency (day/year)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	BW	Body Weight (kg)	70	(d,e,f)
	ATc	Averaging Time for Carcinogens (days) (h)	25,550	(d,e,f)

Notes:
RME - Reasonable Maximum Exposure.
(a) U.S. EPA. 2002. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.* Exhibit 1-2.
(b) Conservative assumption based on the industrial land use.
(c) Construction activities are assumed to occur over a 1 year period.
(d) U.S. EPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors.*
(e) U.S. EPA, 1989. *RAGS, Volume I, Human Health Evaluation Manual (Part A).*
(f) 70 kg body weight and 70 year lifetime are used to be consistent with the development of cancer slope factors.
(g) U.S. EPA, 2004. *RAGS, Volume 1, Human Health Evaluation Manual (Part E),* Exhibit 3-5.
(h) U.S. EPA, 2004. *RAGS, Volume 1, Human Health Evaluation Manual (Part E),* Exhibit 3-2.
(i) U.S. EPA, 1997. *Exposure Factors Handbook, Volume 1,* Table 5-23. Short-term exposures for outdoor workers, heavy activity.

Table D-7.2a
Risk Calculations
Construction Worker: Incidental Ingestion of Soil Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Ing-Risk} = \frac{(\text{Csoil} \times \text{SFo} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{SIR} \times \text{FI})}{(\text{BW} \times \text{ATc})}$$

Equation	Ing - Risk	= (	Csoil	×	SFo	×	CF	×	EF	×	ED	×	SIR	×	FI	) ÷ (	BW	×	ATc	)
Units	unitless		mg/kg		kg-day/mg		kg/mg		days/year		years		mg/day		unitless		kg		days	
Tetrachloroethene	4E-11	= (	1.94E-01	×	5.20E-02	×	1E-06	×	20	×	1	×	330	×	1	) ÷ (	70	×	25550	)

Notes:

Ing - Risk – Ingestion risk
Csoil – Concentration in soil
SFo – Oral Slope Factor.
CF – Unit Conversion Factor
EF – Exposure Frequency
ED – Exposure Duration
SIR – Soil Ingestion Rate
FI – Fraction Ingested from Contaminated Source
BW – Body Weight
ATc – Averaging Time for Carcinogens

Table D-7.2b
Risk Calculations
Construction Worker: Incidental Ingestion of Soil Pathway – Noncarcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Ing - HQ} = \frac{(\text{Csoil} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{SIR} \times \text{FI})}{(\text{BW} \times \text{ATn} \times \text{RfDo})}$$

Equation	Ing - HQ	= (	Csoil	×	CF	×	EF	×	ED	×	SIR	×	FI	) ÷ (	BW	×	ATn	×	RfDo	)
Units	unitless		mg/kg		kg/mg		days/year		years		mg/day		unitless		kg		days		mg/kg-day	
Tetrachloroethene	5.0E-06	= (	1.94E-01	×	1E-06	×	20	×	1	×	330	×	1	) ÷ (	70	×	365	×	1.0E-02	)

Notes:

Ing - HQ – Ingestion Hazard
Csoil – Concentration in Soil
EF – Exposure Frequency
ED – Exposure Duration
SIR – Soil Ingestion Rate
FI – Fraction Ingested from Contaminated Source
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
RfDo – Oral reference dose

Table D-7.3a
Risk Calculations
Construction Worker: Incidental Dermal Contact with Soil Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Derm - Risk} = \frac{(\text{Csoil} \times \text{SFabs} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{EV} \times \text{SA} \times \text{SSAF} \times \text{ABSd})}{(\text{BW} \times \text{ATc})}$$

Equation	Derm - Risk = (	Csoil	×	SFabs	×	CF	×	EF	×	ED	×	EV	×	SA	×	SSAF	×	ABSd	) ÷ (	BW	×	ATc	)
Units	unitless	mg/kg		kg-day/mg		kg/mg		days/year		years		events/day		cm²		mg/cm²-event		unitless		kg		days	
Tetrachloroethene	NA	= (1.94E-01	×	5.20E-02	×	1E-06	×	20	×	1	×	1	×	3,300	×	0.3	×	NA	) ÷ (	70	×	25,550	)

Notes:

Derm - Risk – Dermal Risk
Csoil – Concentration in Soil
SFabs – Absorbed slope factor (SFo ÷ABSgi)
CF – Conversion factor
EF – Exposure Frequency
ED – Exposure Duration
EV – Event Frequency
SA – Skin Surface Area
SSAF – Soil-to-skin Adherence Factor
ABSd – Dermal Soil Absorption Factor
BW – Body Weight
ATc – Averaging Time for Carcinogens
NA – Not Applicable

Table D-7.3b
Risk Calculations
Construction Worker: Incidental Dermal Contact with Soil Pathway – Noncarcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Derm - HQ} = \frac{(\text{Csoil} \times \text{EF} \times \text{EF} \times \text{ED} \times \text{EV} \times \text{SA} \times \text{SSAF} \times \text{ABSd})}{(\text{BW} \times \text{ATn} \times \text{RfDabs})}$$

Equation	Derm - HQ	= (	Csoil	×	CF	×	EF	×	ED	×	EV	×	SA	×	SSAF	×	ABSd	) ÷ (	BW	×	ATn	×	RfDabs	)
Units	unitless		mg/kg		kg/mg		days/year		years		events/day		cm^2		mg/cm^2-event		unitless		kg		days		mg/kg-day	
Tetrachloroethene	NA	= (	1.94E-01	×	1E-06	×	20	×	1	×	1	×	3,300	×	0.3	×	NA	) ÷ (	70	×	365	×	1.00E-02	)

Notes:

Derm - HQ – Dermal Hazard Quotient
Csoil – Concentration in Soil
EF – Exposure Frequency
ED – Exposure Duration
EV – Event Frequency
SA – Skin Surface Area
SSAF – Soil-to-skin Adherence Factor
ABSd – Dermal Soil Absorption Factor
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
RfDabs – Absorbed reference dose (RfDo ×ABSgi)
NA – Not Applicable

Table D-7.4a
Risk Calculations
Construction Worker: Incidental Inhalation of Soil (Fugitive Emissions and Volatile Compounds) Pathway– Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Inh - Risk} = \frac{(\text{Csoil} \times \text{SFi} \times \text{IR} \times \text{EF} \times \text{ED} \times [(1/\text{VF}) + (1/\text{PEF})])}{(\text{BW} \times \text{ATc})}$$

Equation	Inh - Risk	= (	Csoil	×	SFi	×	IR	×	EF	×	ED	× [	1	/	VF	+	1	/	PEF	]) ÷ (	BW	×	ATc	)
Units	unitless		mg/kg		kg-day/mg		m³/day		days/year		year				m³/kg				m³/kg		kg		days	
Tetrachloroethene	1.68E-08	= (	1.94E-01	×	2.03E-03	×	20	×	20	×	1	× [	1	/	5.24E+00	+	1	/	1.60E+08	]) ÷ (	70	×	25,550	)

Notes:

Inh - Risk – Inhalation Risk
Csoil – Concentration in Soil
SFi – Inhalation Slope Factor
IR – Inhalation Rate
EF – Exposure frequency
ED – Exposure duration
VF – Volatilization Factor
PEF – Particulate Emission Factor
BW – Body Weight
ATc – Averaging Time for Carcinogens

Table D-7.4b
Risk Calculations
Construction Worker: Incidental Inhalation of Soil (Fugitive Emissions and Volatile Compounds) Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Inh - HQ} = \frac{(\text{Csoil} \times \text{IR} \times \text{EF} \times \text{ED} \times ([1/\text{VF}] + [1/\text{PEF}]))}{(\text{BW} \times \text{ATn} \times \text{RfDi})}$$

Equation	Inh - HQ	= (	Csoil	×	IR	×	EF	×	ED	× [	1	/	VF	+	1	/	PEF	]) ÷ (	BW	×	ATn	×	RfDi	)
Units	unitless		mg/kg		m³/day		days/year		year				m³/kg				m³/kg		kg		days		mg/kg-day	
Tetrachloroethene	3.39E-03	= (	1.94E-01	×	20	×	20	×	1	× [	1	/	5.24E+00	+	1	/	1.60E+08	]) ÷ (	70	×	365	×	1.71E-01	)

Notes:

Inh - Risk – Inhalation Hazard Qubtient
Csoil – Concentration in Soil
IR – Inhalation Rate
EF – Exposure frequency
ED – Exposure duration
ET – Exposure Time
VF – Volatilization Factor
PEF – Particulate Emission Factor
RfDi – Inhalation Reference Dose
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
NV – No toxicity value available for this pathway.
NA – Not Applicable

Table D-7.4c
Construction Worker: Volatilization Factor Calculations
Ashland – Clearfield, Utah

Equation:

$$VF_{sc} = \left[\frac{(3.14 \times D_A \times T)^{1/2}}{2 \times \rho_b \times D_A}\right] \times 10^{-4}\, m^2/cm^2 \times Q/C_{sa} \times \frac{1}{F_D}$$

Chemical	Q/C_{sa} $(g/m^2\text{-}s)/(kg/m^3)$	π	D_A (cm^2/s)	T (s)	2	ρb (g/cm^3)	10^{-4} (m^2/cm^2)	$1/F_D$ unitless	VF (m^3/kg)
Tetrachloroethene	13.01	3.14	4.69E-03	1.73E+06	2	1.5	1.00E-04	5.24E+00	2.14E-03

Notes: Default values are as presented in Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA 2002a).

VF – Volatilization Factor (m^3/kg) (calculated)
π – pi (3.14)
DA – Apparent Diffusivity (cm^2/s)
T – Exposure interval (s)
ρb – Dry soil bulk density (g/cm^3) (site-specific value)

$$Q/C_{sa} = A \times \exp\left[\frac{(\ln A_c - B)^2}{C}\right]$$

Q/C_{sa} – Inverse of the ratio of the 1-h. geometric mean air concentration and the volatilization flux at the center of a square emission source (g/m^2-s per kg/m^3)
A – 2.4538
B – 17.566
C – 189.0426
A_c – Areal extent of site soil contamination (36,000 sq ft or 0.826443 acres).

Equation	Q/C_{sa}	=	A	$ln\, A_c$	B	C
Units	$(g/m^2$-s per $kg/m^3)$			acres		
All Chemicals	13.01	=	2.4538	0.826443	17.57	189.0426

Table D-7.4d
Construction Worker: Apparent Diffusivity Calculations
Ashland – Clearfield, Utah

Equation:

$$D_A = \frac{\left(\theta_a^{3.33} \times D_i \times H'\right) + \left(\theta_w^{3.33} \times D_w\right)}{\eta^2} \times \frac{1}{\left(\rho_b \times K_d\right) + \theta_w + \left(\theta_a \times H'\right)}$$

Chemical Units	θ_a (Lair /Lsoil)	D_i (cm^2/s)	H' unitless	θ_w (Lwater /Lsoil)	D_w (cm^2/s)	η (Lpore /Lsoil)	ρ_b (g/cm^3)	ρ_s (g/cm^3)	K_{oc} (cm^3/g)	K_d (cm^3/g)	D_A (cm^2/s)	Source		
												D_i	D_w	K_{oc}
Tetrachloroethene	2.84E-01	7.20E-02	7.54E-01	0.15	8.20E-06	4.34E-01	1.5	2.65	1.55E+02	9.30E-01	4.69E-03	ORNL	SSL	SSL

D_A – apparent diffusivity
θ_a – air-filled soil porosity
D_i – diffusivity in air
H' – dimensionless Henry's law constant
θ_w – water-filled soil porosity
D_w – diffusivity in water
η – total soil porosity
ρ_b – dry soil bulk density
ρ_s – soil particle density
K_d – soil-water partition coefficient, where:
$K_d = K_{oc} \times f_{oc}$
K_{oc} – soil organic carbon partition coefficient (cm^3/g)
f_{oc} – fraction organic carbon in soil (g/g) (A default value of 0.006 g/g was used.)
ORNL – Oak Ridge National Laboratory Risk Assessment Information System http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
SSL – Supplemental Guidance for Developing Soil Screening Levels For Superfund Sites (USEPA, 2002a)

Table D-7.4e
Construction Worker: Particulate Emission Factor Calculations
Ashland – Clearfield, Utah

$$PEF_{sc} = Q/C_{sr} \times \frac{1}{F_D} \times \left[\frac{T \times A_R}{556 \times \left(\frac{W}{3}\right)^{0.4} \times p \times \Sigma VKT} \right]$$

PEF_{sc} – Subchronic road particulate emission factor

Q/C_{sr} – Inverse of a 1-hour average air concentrations along a straight road segment

F_D – Dispersion correction factor (unitless)

T – Total time over which construction occurs (in seconds), 960 hrs x 60 min/hr x 60 sec/min = 3.46E+06 sec

A_R – Surface area of contaminated road segment (m^2)

6.5 acres × (4,048 m^2/acre) = 26,304.36 m^2. The square root of 2,025,000 m^2 is 162.21 m
Assuming the road is 162.19 m (535.29 ft) long and 16 ft wide
$A_R = L_R \times W_R \times 0.092903\ m^2/ft^2$

W – Mean vehicle weight, where:
W = 40 tons

p – Percentage of days with at least 0.01 inches of precipitation, minimum of 80 days/yr for Salt Lake City, based on Exhibit 5-2 (70/365 = 0.19).

ΣVKT – Sum of fleet vehicle traveled during the exposure duration (kilometers), assuming all trucks travel once a day, where:
ΣVKT = 1 vehicles × 1.4 km/day × (2 wks/yr ÷ 2) × 5 days/wk
= 7

Equation	PEF_{sc}	=	Q/C_{sr}	× [1 ÷	F_D	] × [(	T	×	A_R	) ÷ [556 × (W / 3)$^{0.4}$ ×	p	× ΣVKT]]
Units	m^3/kg		g/m^2-s per kg/m^3		unitless		s		m^2	tons		km
All Chemicals	1.60E+08	=	23.02	× [1 ÷	0.19	] × [(	3.46E+06	×	7.96E+02	) ÷ [556 × (40 / 3)$^{0.4}$ ×	0.19	× 7]]

Default values are as presented in Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (USEPA 2002).

CALCULATION OF SURFACE AREA OF CONTAMINATED ROAD SEGMENTS (A_R)

A_R	=	L_R	×	W_R	×	0.092903
m^2		ft		ft		m^2/ft^2
7.96E+02	=	535.29	×	16	×	0.092903

where:

A_R = Surface area of contaminated road segment (m^2)

L_R = Length of road segment (ft)

L_R = square root of site surface contamination (6.5 acres)
= (4,048 m^2/acre × 6.5 acres = (2.63E+04 m^2)$^{1/2}$ = 162.21 m = 535.29 ft

W_R = Width of road segment (ft)

Table D-7.4f
Construction Worker: Dispersion Correction Factor Calculations
Ashland – Clearfield, Utah

Equation:

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9.6318}{t_c^2}$$

F_D = Dispersion correction factor (unitless)
t_c = Duration of construction (hr), estimated using the following equation:
t_c = (8 hrs/workday) × (20 workdays/month) × 6 months = 960 hrs

F_D	=	0.1852	+	(	5.3537	÷	t_c hours	)	+	((	-	9.6318	)	÷	(	t_c hours	)	^{2})
0.19	=	0.1852	+	(	5.3537	÷	960	)	+	((	-	9.6318	)	÷	(	960	)	^{2})

Table D-7.5
Chemicals in Surface and Surface and Subsurface Soil
Risk and Hazard Summary
Construction Worker
Ashland – Clearfield, Utah

	Carcinogenic Risk							Noncarcinogenic Hazard							
Equation Units	CR unitless	=	Ingestion unitless	+	Dermal unitless	+	Inahalation unitless	HQ unitless	=	Ingestion unitless	+	Dermal unitless	+	Inahalation unitless
Tetrachloroethene	2E-08	=	3.73E-11	+	NA	+	1.68E-08	3E-03	=	5.02E-06	+	NA	+	3.39E-03
Soil CR	**2E-08**	=	3.73E-11	+	NA	+	1.68E-08	**Soil HI**	**3E-03**	=	5.02E-06	+	NA	+	3.39E-03

Notes:

NA – Not Applicable
CR – Cancer Risk
HQ – Hazard Quotient
HI – Hazard Index

Table D-8.1
Construction Worker: Water Pathway Exposure Parameter Values
Ashland – Clearfield, Utah

Exposure Pathway	Parameter	Description	Construction Worker	
			RME	Source
Incidental Ground Water Ingestion	WIR	Ground Water Ingestion Rate (L/day)	0.024	(a)
	EF	Exposure Frequency (d/yr)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	ET	Exposure Time (hours/event)	0.5	(b)
	BW	Body Weight (kg)	70	(d,f)
	AT_n	Averaging Time Noncarcinogens (days)	365	(e)
	AT_c	Averaging Time Carcinogens (days)	25,550	(d,f)
Dermal Contact with Ground Water	SA	Skin Surface Area Exposed (cm^2)	3,300	(g)
	EF	Exposure Frequency (d/yr)	20	(b)
	ED	Exposure Duration (years)	1	(c)
	EV	Event Frequency	1	(f)
	ET	Exposure Time (hours/event)	0.5	(b)
	BW	Body Weight (kg)	70	(d,f)
	AT_n	Averaging Time Noncarcinogens (days)	365	(e)
	AT_c	Averaging Time Carcinogens (days) (l)	25,550	(d,f)

Notes:
RME - Reasonable Maximum Exposure.
(a) USEPA, 1989. Risk Assessment Guidance for Superfund, Volume I. Value is one-fiftieth of that assumed to occur during a swimming event.
(b) Site-specific value. It is assumed that excavation activities would take 20 days to complete.
(c) Construction activities area assumed to occur over a 1 year period.
(d) USEPA, 1989. Risk Assessment Guidance for Superfund, Volume I (Part A).
(e) The averaging time for noncarcinogens is equal to the Exposure Duration (in yrs) × 365 day/yr (US EPA, 1989).
(f) 70 year lifetime is used to be consistent with the development of cancer slope factors.
(g) USEPA, 2004. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Exhibit 3-5. Skin surface area available for contact for industrial workers.

Table D-8.2a
Risk Calculations
Construction Worker: Incidental Ingestion of Groundwater Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Ing-Risk} = \frac{(\text{Cwater} \times \text{WIR} \times \text{EF} \times \text{ED} \times \text{SFo})}{(\text{BW} \times \text{ATc})}$$

Equation	Ing - Risk	= (	Cwater	×	WIR	×	EF	×	ED	×	SFo	) ÷ (	BW	×	ATc	)
Units	unitless		mg/L		L/day		days/year		years		kg-day/mg		kg		days	
Tetrachloroethene	8.51E-11	= (	6.10E-03	×	2.40E-02	×	20	×	1	×	5.20E-02	) ÷ (	70	×	25,550	)

Notes:

Ing-Risk – Carcinogenic Risk Water Ingestion Pathway
Cwater – Concentration in Water
WIR – Water Ingestion Rate
EF – Exposure Frequency
ED – Exposure Duration
SFo – Oral Slope Factor
BW – Body Weight
ATc – Averaging Time for Carcinogens

Table D-8.2b
Risk Calculations
Construction Worker: Incidental Ingestion of Groundwater Pathway – Noncarcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Inh-HQ} = \frac{(\text{Cwater} \times \text{WIR} \times \text{EF} \times \text{ED})}{(\text{BW} \times \text{ATn} \times \text{RfDo})}$$

Equation	Ing - HQ	= (	Cwater	×	WIR	×	EF	×	ED	) ÷ (	BW	×	ATn	×	RfDo	)
Units	unitless		mg/L		L/day		days/year		years		kg		days		mg/kg-day	
Tetrachloroethene	1.15E-05	= (	6.10E-03	×	2.40E-02	×	20	×	1	) ÷ (	70	×	365	×	1.00E-02	)

Notes:

Ing-HQ – Water Ingestion Pathway Hazard Quotient
Cwater – Concentration in water
WIR – Water Ingestion Rate
EF – Exposure Frequency
ED – Exposure Duration
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
RfDo – Oral Reference Dose

Table D-8.3a
Risk Calculations
Construction Worker: Dermal Contact with Groundwater Pathway – Carcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Derm-Risk} = \frac{(DA_{event} \times EV \times ED \times EF \times SA \times SFabs)}{(BW \times ATc)}$$

Equation	Derm-Risk	= (	DA_{event}	×	EV	×	ED	×	EF	×	SA	×	SFabs	) ÷ (	BW	×	ATc	)
Units	unitless		mg/cm²-event		events/day		years		days/year		cm²		kg-day/mg		kg		days	
Tetrachloroethene	1.38E-06	= (	7.19E-04	×	1	×	1	×	20	×	3,300	×	5.20E-02	) ÷ (	70	×	25,550	)

Notes:

Derm-Risk – Carcinogenic Risk Dermal Contact with Water Pathway
DA_{event} – Absorbed Dose per Event
EV – Event Frequency
ED – Exposure Duration
EF – Exposure Frequency
SA – Skin Surface Area Available for Contact
SFabs – Absorbed Slope Factor
BW – Body Weight
ATc – Averaging Time for Carcinogens

Table D-8.3b
Risk Calculations
Construction Worker: Dermal Contact with Groundwater Pathway – Noncarcinogenic Effects
Ashland – Clearfield, Utah

$$\text{Derm-HQ} = \frac{(DA_{event} \times EV \times ED \times EF \times SA)}{(BW \times ATn \times RfDabs)}$$

Equation	Derm-Risk	= (	DA_{event}	×	EV	×	ED	×	EF	×	SA	) ÷ (	BW	×	ATn	×	RfDabs	)
Units	unitless		mg/cm²-event		events/day		years		days/year		cm²		kg		days		mg/kg-day	
Tetrachloroethene	1.86E-01	= (	7.19E-04	×	1	×	1	×	20	×	3,300	) ÷ (	70	×	365	×	1.00E-02	)

Notes:

Derm-HQ – Dermal Contact with Water Pathway Hazard Quotient
DA_{event} – Absorbed Dose per Event
EV – Event Frequency
ED – Exposure Duration
EF – Exposure Frequency
SA – Skin Surface Area Available for Contact
BW – Body Weight
ATn – Averaging Time for Noncarcinogens
RfDabs – Absorbed Reference Dose

Table D-8.3c
Dermal Absorbed Dose per Event for Organic Chemicals in Water
Ashland – Clearfield, Utah

If $t_{event} > t^*$, then: $$DA_{event} = FA \times K_p \times Cwater \left[\frac{t_{event}}{1+B} + 2\tau_{event} + \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$$

Equation	DA_{event}	=	FA	×	K_p	×	Cwater	× { (	t_{event}	/	1	+	B	) +	2	τ_{event}	+ [	1	+ (	3	B	) + (	3	B	²)] / (	1	+	B	) ²] }
Units	mg/cm²-event		unitless		cm/hour		mg/cm³		hour/event		unitless				hour/event			unitless				unitless				unitless		
Tetrachloroethene	7.19E-04	=	1	×	3.34E-02	×	6.10E-03	× { (	0.5	/	1	+	1.66E-01	) +	2	0.91	+ [	1	+ (	3	1.66E-01	) + (	3	1.66E-01	²)] / (	1	+	1.66E-01	) ²] }

Notes:

DA_{event} – Absorbed Dose per Event
FA – Fraction Absorbed Water
K_p – Dermal Permeability Coefficient of Compound in Water
C_{water} – Concentration in Water
τ_{event} – Lag Time per Event
t_{event} – Event Duration
B – Dimensionless Ratio of the Permeability Coefficient
t^* – Time to Reach Steady-state

Table D-8.4
Chemical in Groundwater
Risk and Hazard Summary
Construction Worker
Ashland – Clearfield, Utah

	Carcinogenic Risk					Noncarcinogenic Hazard				
Equation	CR	=	Ingestion	+	Dermal	HQ	=	Ingestion	+	Dermal
Units	unitless		unitless		unitless	unitless		unitless		unitless
Tetrachloroethene	*1E-06*	=	8.51E-11	+	1.38E-06	2E-01	=	1.15E-05	+	1.86E-01

Groundwater CR	**1E-06**	=	8.51E-11	+	1.38E-06	**Groundwater HI**	**2E-01**	=	1.15E-05	+	1.86E-01
Soil CR	**7E-08**					**Soil HI**	**5E-03**				
Groundwater + Soil CR	**1E-06**					**Groundwater + Soil HI**	**2E-01**				

Notes:

NA – Not Applicable
CR – Cancer Risk
HQ – Hazard Quotient
HI – Hazard Index